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Characterization of the 1986 Metal and Nonmetal Mining Workforce

By Shail J. Butani and Ann M. Bartholomew

UNITED STATES DEPARTMENT OF THE INTERIOR

Information Circular 9193

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UNITED STATES DEPARTMENT OF THE INTERIOR
Donald Paul Hodel, Secretary

BUREAU OF MINES
T S Ary, Director

TN295
.U4
no. 9193

Library of Congress Cataloging-in-Publication Data

Butani, Shail J.
Characterization of the 1986 metal and nonmetal mining workforce.

(Information circular ; 9193)

Bibliography: p. 7

Supt. of Docs. no.: I 28.27:9193

1. Miners—United States. I. Bartholomew, Ann M. II. Title. III. Series: Information circular (United States. Bureau of Mines) ; 9193.

TN23.U43 622 s 331.7'622'0973 88-600141 HD8039.M61U44

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CHARACTERIZATION OF THE 1986 METAL AND NONMETAL MINING WORKFORCE

By Shail J. Butani[1] and Ann M. Bartholomew[2]

ABSTRACT

In 1986, the Bureau of Mines conducted a probability sample survey, Mining Industry Population Survey, to measure such employee characteristics as occupation; principal equipment operated; work location at the mine; present job, present company, and total mining experience; job-related training during the last 2 yr; age; sex; race; and education. The population estimates are necessary to properly analyze the Mine Safety and Health Administration (MSHA) injury (includes illness and fatality data) statistics; that is, to compare and contrast injury rates for various subpopulations in order to identify those groups that are exhibiting higher than average injury rates.

This report uses the survey's results to characterize the U.S. metal and nonmetal mining (includes metal, stone, sand and gravel, and nonmetal industries) workforce from March through September 1986. A companion report, Information Circular (IC) 9192, "Characterization of the 1986 Coal Mining Workforce," provides similar information for the U.S. coal mining industry.

[1] Mathematical statistician (now with Bureau of Labor Statistics, Washington, DC).
[2] Statistical assistant.
Twin Cities Research Center, Bureau of Mines, Minneapolis, MN.

INTRODUCTION

According to the occupational safety and health (OSH) statistics published annually by the U.S. Department of Labor, Bureau of Labor Statistics, the mining industry (excluding oil and gas extraction) always has had one of the highest injury incidence rates among the major industry divisions. One of the primary objectives of the Bureau of Mines is to conduct research in the area of health and safety of the nation's miners, aimed at reducing the incidence rate of work-related injuries (includes illnesses and fatalities) in the domestic mining industry. In order to reduce the overall incidence rate, the Bureau needs to identify which groups or subpopulations of the workforce are exhibiting higher than average incidence rates.

To identify the high-risk groups, information about the injured workers and about the entire workforce is required. Present regulations permit MSHA to collect information on all mine injuries requiring medical attention. Hence, a data base containing various characteristics on the *injured* workforce is available. Since similar information about the *entire* workforce was not available, the Bureau conducted a probability sample survey called the Mining Industry Population Survey (MIPS), also known as the demographics survey, to collect the necessary data. The 1986 survey measured the following characteristics: job title or occupation, principal equipment operated, work location at mine, experience at present job, experience at present company, total mining experience, job-related training during the last 2 yr, age, sex, race, and education. This demographics survey provided information about the population at risk and will aid research in pinpointing the hazardous segments of the population, as illustrated by the following example.

Throughout this report, unless otherwise stated, the term metal and nonmetal mining industry includes the metal, stone, sand and gravel, and nonmetal industries; this is the standard terminology used by MSHA. From MSHA's metal and nonmetal injury data base, it is known that 8,890 males and 177 females working in the U.S. metal and nonmetal mining industry were injured in 1986. If information about the population at risk (i.e., the number of male and female workers for the metal and nonmetal industry in 1986) is not known, then it is not valid to draw the conclusion that male miners are at a much higher injury risk than female miners. The estimates from the demographics survey show that there were a total of 167,245 male workers and 11,522 female workers (table E-23) employed in U.S. metal and nonmetal mining in 1986. Of these workers, the nonoffice workforce identified by occupation or job title consists of 161,883 males and 4,523 females (table E-8). The reason for excluding office workers from the analysis is to account for some of the obvious difference in job risk. It should be noted that in the office worker category, only 3 pct are males and 61 pct are females (table E-23). The added information on the population puts the injury statistics in a better perspective, as shown in table 1.

Table 1.—Population and injury statistics for 1986 metal and nonmetal mining sector

	Population statistics		Injury statistics			
	Workers	pct	Injuries	pct	Lost workdays	pct
Male	161,883	97.3	8,890	98.0	129,595	98.3
Female	4,523	2.7	177	2.0	2,294	1.7
Total	166,406	100.0	9,067	100.0	131,889	100.0

Since the difference between the population and injury as well as lost workdays distribution is relatively large, it would be interesting to further investigate the source of variation. Could it be due to variations in the job mix by sex?

Hence, the present research will aid in finding solutions to reduce the injury incidence rates for the high-risk groups. That is, the collected information will be used to compare and contrast the demographics composition of the hazardous groups with those of the safer groups. Thus, through present research, the differences and similarities between the two groups can be defined.

The purpose of this report is to provide the U.S. metal and nonmetal mining population estimates for March through September 1986 by various characteristics. This information is essential to performing the injury data analysis that is the ultimate goal of the survey.

ACKNOWLEDGMENTS

The authors thank the officials of the U.S. Department of Labor, MSHA, for submitting the MIPS justification package to the Office of Management and Budget for its clearance to collect the data. Special thanks go to Kathy Snyder, public affairs specialist, Office of Information and Public Affairs, MSHA, for initiating the study, and to Edwin Thomasson, research liaison officer, Technical Support, MSHA, for his continuous effort and support.

SURVEY METHODOLOGY

POPULATION

The MIPS covered all workers employed in the anthracite coal (SIC[3] 111), bituminous coal (SIC 121), metal (SIC 101-106, 109, 281), stone (SIC 141, 142, 324, 327), sand and gravel (SIC 144), and nonmetal (SIC 131, 145, 147, 149, 289, 299) mining industries of the United States during the period March through September 1986. This report gives estimates only for the metal and nonmetal (noncoal) mining sector; IC 9192 gives estimates for the 1986 coal mining sector.

The information pertaining to the mine employees included in the survey was collected through the mine operators, because a comprehensive sampling frame (name and address file) of the workers in mine establishments was not available, and cost considerations prohibited the data collection through personal visits. The number of universe units (establishments under MSHA's jurisdiction) covered by the scope of this survey

[3] The Standard Industrial Classification (SIC) was revised in 1987; the industry group numbers used here are those in effect at the time of the MIPS.

was approximately 18,350, with a total employment level of about 350,000. The number of establishments and employment for the metal and nonmetal mining was about 10,600 and 190,000, respectively. The scope of the data for the employees covered by the survey is the same as that of the data collected by MSHA form 7000-1 for mine accidents, injuries, illnesses, and fatalities, and MSHA form 7000-2 for quarterly mine employment. The collection of the fundamental statistics reported on these two forms is required by law (30 U.S.C. 813; 30 CFR 50).

SAMPLE

The principal feature of the survey sample design was its use of two-stage stratified random sampling. The primary sampling units (first stage) were the mine establishments; the secondary sampling units were employees within each of the chosen mine establishments. The characteristics used to stratify the primary units were the industry (anthracite coal, bituminous coal, metal, stone, sand and gravel, nonmetal); mine type (underground, surface, plant or mill); employment size class (1-19, 20-49, 50-99, 100-249, 500-999, 1,000 and above); and status code (active, intermittent). Since the first three stratification characteristics are highly correlated with the characteristics that the survey was to measure, use of stratified sampling increased the efficiency of the sample design and thus resulted in a smaller required sample size. The fourth characteristic, status code, was chosen so that nonresponse adjustment could be made within more homogenous groups. This is desirable because proportionately higher numbers of nonmailable, out-of-business, refusal, etc., responses are reported from intermittent mine establishments than from active mine establishments.

The sampling frame used for this survey was the 1985 preliminary address and employment file maintained by MSHA. A probability sample of 2,232 metal and nonmetal (noncoal) mining establishments from a universe of 10,612 metal and nonmetal establishments was selected by stratifying the frame as previously described and using a systematic sampling procedure with a random start for each stratum. The employees within an establishment were selected by using a systematic sampling procedure with a common random start for each employment size class.

A brief description of the sample allocation is as follows. For larger employment size classes, the allocation procedure placed all of the establishments on the frame in the sample as primary sampling units from which the employees were subsampled at a low frequency rate. As employment size class decreased, smaller and smaller proportions of the establishments were included as primary sampling units, but the employees within the establishments were subsampled at a higher frequency rate. The use of this procedure gave each employee, to the extent possible, about the same probability of inclusion in the sample, thus reducing the sampling variability. In order to limit the response burden for any one establishment, a maximum sample of 50 employees per establishment was selected.

DATA COLLECTION

The MIPS was conducted from March through September 1986 by mail questionnaire through the Bureau's Twin Cities (MN) Research Center. A reproduction of the original letter, followup letter, and the questionnaire bearing the Office of Management and Budget clearance number authorizing collection of the data are included in appendix F.

Table 2 gives a summary of the results for the metal and nonmetal mining sector from the original and followup mailings, as well as from telephone calls to the nonrespondents.

Table 2.—Demographics survey response status: 1986 metal and nonmetal mining sector

Industry	Population	Sample	Overall response		In-scope[1] records	Usable response	
			No.	pct		No.	pct
Metal	617	220	211	96	176	138	78
Stone	3,373	852	734	86	794	627	79
Sand and gravel	5,579	863	810	94	734	646	88
Nonmetal	1,043	297	282	95	256	219	86
Total	10,612	2,232	2,037	91	1,960	1,630	83

[1] Nonrespondents + usables + refusals + unusables (excludes out-of-businesses, nonmailables, duplicates, temporary inactives, and new businesses under construction).

A brief description of the response terms follows:

Response code	*Description*
Nonrespondent	Received no response from the establishment.
Usable	Establishment provided usable data.
Refusal	Establishment refused to provide any data.
Unusable	Establishment provided data that were not in usable format.
Nonmailable	Establishment's address was either insufficient or wrong.
Duplicate	Data were combined with another establishment's data.
Out-of-business	Establishment was permanently closed.
New business	Establishment was in development stage.
Temporary inactive	Establishment was temporarily not operating.

As part of the data collection phase, all the returns were reviewed and edited for completeness and reasonableness of the data. Whenever there were inconsistencies, the respondents were called for reconciliation. Also, almost all of the respondents that had initially refused to participate in the survey were contacted by phone. Approximately 80 pct of these respondents ultimately supplied data. Adjustments for those mine establishments that did not supply the data, or supplied partial data, are explained in the "Estimation Procedures" section and in appendix C.

DATA CODING, ENTERING, AND EDITING

The returns underwent a very comprehensive review and editing process in order to (1) minimize the reporting differences among the respondents (establishments), (2) ensure consistency of coding among the individual worker entries, (3) ensure the accuracy of the data entry, and (4) ensure compatibility of occupation and equipment coding with the MSHA accident data base.

ESTIMATION PROCEDURES

In a simple random sampling plan, all units are sampled with the same sampling ratio. To derive the population estimates, the sample units are weighted (replicated) by the inverse

of the sampling ratio. Because of efficiency consideration, the data for this demographics study were collected using a complex survey design. Hence, the data for each worker, the ultimate sampling unit, were not equally weighted. Instead, the population estimates were derived by weighting data for each worker with the appropriate final weight of the data, which was the product of the following three factors: (1) the inverse of the sampling ratio with which the primary sampling unit (establishment) was sampled; (2) a nonresponse adjustment factor that was computed separately for each sampling stratum and assigned to all responding establishments in a stratum to account for those establishments in that stratum that did not respond; and (3) the inverse of the sampling ratio with which the secondary sampling units (workers) were selected. A detailed discussion of the different weights and estimation formulas are given in appendix C. In statistical terms, the survey's estimates of the population total were based on a Horvitz-Thompson estimator (*1*).[4]

No adjustment was made for partial nonresponse. That is, the characteristics that were left blank by the respondents were coded as unspecified and were, naturally, weighted by their appropriate final weight in computing the population estimates. The percentage unspecified for a particular characteristic gives the user an indication of the completeness of the schedules.

GROUPING OF CHARACTERISTICS

The original data base has detailed data for the characteristics mentioned below. For purposes of publication, the detailed data were combined into groups. Please contact the authors to obtain detailed data or a different grouping of the data for any or all of the characteristics.

Job Title and Principal Equipment Operated

Since the original data base has about 100 codes for each of these two categories (see appendixes A and B), the entries were combined into 20 to 25 groups. Similarities of the job title or principal equipment operated and number of workers in each entry were two of the main criteria used in forming the groups.

Employment Size Class

The classes used for this characteristic are the standard size class definition used by MSHA. Because there were very few mines for the size class having 1,000 or more employees, the estimates for this class were computed separately and then were combined with the estimates for employment size class 500 through 999 in order to protect the confidentiality of the mines as well as the workers. The combined size class is labeled as 500+.

Present Job, Present Company, and Total Mining Experience

The data for all three of these characteristics were coded only as the number of years. It was felt that data were not reliable enough to be accurate to the month. The groupings were formed to be as compatible as possible to the groupings used by MSHA for its injury statistics.

[4] Italic numbers in parentheses refer to items in the list of references preceding the appendixes at the end of this report.

Job-Related Training During Last 2 Years

The grouping for this characteristic was formed to reflect the definite and logical intervals that various mine operators employ and that meets the need of the mine safety personnel. The most frequently reported number was 16 h for training during the last 2 yr; this is because MSHA requires a minimum training of 8 h/yr. Also, MSHA and safety personnel are interested in knowing the percent of workers who receive no training. Hence, both 0 and 16 h were categorized separately.

Age

The groupings for age were formed to be about the same as what MSHA uses for its accident statistics.

RELIABILITY OF ESTIMATES

As stated in reference 2:

> All estimates derived from a sample survey are subject to sampling and nonsampling errors. Sampling errors occur because observations are made on a sample, not on the entire population. Estimates based on the different possible samples of the same size and sample design could differ. Nonsampling errors in the estimates can be attributed to many sources, e.g., inability to obtain information about all cases in the sample, mistakes in recording or coding the data, definitional difficulties, etc.

Nonsampling errors occur in a census as well as in a sample survey. As mentioned earlier, the completed forms underwent a very comprehensive review and edit process. This was primarily done to minimize the nonsampling errors.

In a probability sample, the coefficients of variation (CV's), which are a measure of the sampling errors in the estimates, can be estimated from the survey data. CV's were calculated for the basic characteristics as part of the survey estimation process; these CV's as well as the corresponding estimates for number of workers are given in tables E-49 through E-56. The CV's for other estimates can also be derived if requested. The methodology used to compute the estimated CV's is given below.

By definition, the CV of any sample estimate is equal to the standard error of the estimate divided by the value of the estimate (*3*). In other words, it is a measure of relative variation. Because the survey data will be used by numerous researchers to measure different statistics (e.g., totals, means, medians, percentages) by various cross-classification categories, it was not feasible to use the exact formula for the standard error estimates. Hence, a generalized formula that approximated the exact formula and that was easy to implement for computing all the standard error estimates was developed. It should be noted that since the survey uses a complex sampling design, the usual variance, standard deviation, and standard error estimates computed by the software packages are no longer valid because they are based on simple random sample design. The reliability measures for this survey were computed by employing a random group variance technique. A brief description of it is given in appendix D and a detailed discussion is given in reference 4.

The purpose of producing a reliability measure for this report is to define the confidence interval or range that would include the comparable complete coverage value. For example, the total number of estimated truck drivers for the 1986 metal and nonmetal industry was 20,830 (table E-2 and E-50) with

a CV of 3.5 pct (table E-50). Based on this information, the standard error on the total number of truck drivers is 729 (estimate × CV = 20,830 × 0.035) and the 95-pct confidence interval is 19,372 to 22,288 (20,830 ± 2 × 729). This means that with 95 pct confidence, it can be said that the interval 19,372 to 22,288 includes the total number of metal and nonmetal truck drivers that would have been obtained from a census of the frame.

It should be noted that normally the variance (square of the standard error) of a total pertaining to the combined four industries would be equal to the sum of the variances for each industry since the four industries were sampled independently. That is, the variance for the total number of truck drivers for the entire metal and nonmetal mining industry would be equal to the sum of the variances for the truck drivers in metal, stone, sand and gravel, and nonmetal mining industries. However, this methodology was not employed to compute the variance estimates for the combined four industries, instead, even for this estimate, the random group variance technique as described in appendix D was employed. This was primarily done, as mentioned previously, because the survey data will be used by numerous researchers to measure different statistics (other than totals) such as means, medians, percentages, etc., and for these statistics the variance for the combined four industries will not be the simple sum of the variances for each industry. Hence, for reasons of consistency and simplicity the random group variance estimator was used to compute all variances and thus CV estimates.

In general, the smaller the subpopulation size, the larger the variability in the estimates. Additionally, the larger the nonresponse, the less reliable the estimate may be. As mentioned earlier, nonresponse error is considered a nonsampling error. This error occurred more frequently for estimates of job-related training during the last 2 yr and total mine experience than for other variables because conceptually these variables are harder to report. Moreover, it is possible that the training estimates might be somewhat biased because many respondents filled in 16 h, the minimum number of hours required by MSHA over a 2-yr period.

VALIDATION OF ESTIMATES

Once the estimates were produced, they were validated for accuracy and reasonableness by several mining industry specialists. Additionally, the total employment for each industry was compared to an independent census conducted by MSHA, the results of which are reported in references 5 through 9. The injury experience reports tabulate the injury-illness-fatality data reported to MSHA on form 7000-1 and employment data reported on form 7000-2. While the data base used to compile the statistics for these reports contains detailed information for the injured victims, it does not contain similar information for the entire workforce. The breakdown of total employment is available only by type of ore mined, employment size class, and work location. Hence, the MIPS was conducted so that MSHA injury data could be analyzed in greater detail.

The data show that the overall employment figures from the two sources differed about 8 pct for metal and nonmetal (metal, stone, sand and gravel, and nonmetal) mining industry, with the MSHA figures being higher than those of the demographic survey. The difference in the estimates is caused in part by differences in reporting, coverage period, definitions, and methodology as explained below for data comparison by employment size class and by work location.

When comparing distribution of workers by employment size class, the differences between the numbers in table E-1 of this report and MSHA data, as stated in tables 4 of references 5, 6, and 8, and in table 3 of reference 7, are substantial. This is mainly due to the differences in definition and methodology. The MIPS classification is based on total employment of an establishment as it existed when the respondents filled out the questionnaire. MSHA collects employment on a quarterly basis and for each quarter it is possible for the employment to be broken into a maximum of four different work location; hence, each establishment may have up to 16 different employment figures.

Per MSHA's methodology, the size groups are classified according to the lowest numbered (primary) subunit's average employment of four quarters and *not on the total employment* of an establishment, as is the case with the MIPS. For example, if an establishment's annual average employment is 60, but the employment for the primary subunit, say underground, is 15, then the establishment per MSHA's methodology is in size class 1 through 19, whereas according to the MIPS procedure it is in size class 50 through 99. It is for this reason the average employment per operation as stated in table 4 of reference 6 is 6.7 for size class 1-4. It should be noted that MSHA classification overestimates the employment in smaller size classes.

In view of the above, the injury data as published in references 5 through 9 by size class should not be analyzed against the MIPS employment size class data. Instead, the analyst needs to retabulate the MSHA injury data from the original data tapes so that the size class definition corresponds to the MIPS.

Also, a large difference existed between MIPS and MSHA figures for employment distribution by work location. This is primarily due to differences in reporting. The employment reported to MSHA every quarter is in aggregate numbers for each work location (maximum of four). Generally, this type of reporting results in gross approximations in the breakdown of variables such as employment. For the MIPS data, the work location was reported for each worker in the sample, in the same manner as it is reported to MSHA on form 7000-1 for each injured worker. It should be noted that the data on work location for individual workers is known with more specificity than for the whole population. Hence, it is appropriate to analyze the survey work location data with MSHA injury statistics.

Additionally, a small portion of the difference in the two estimates is due to the job title category of office workers. The MIPS underestimated the number of employees in this category because many respondents assumed that these workers very seldom incur injuries and therefore were not to be reported. For the purposes of accident analysis, the office workers are to be excluded because of the obvious difference in the injury risk. Hence, the difference in counts of office workers does not make any difference.

SUMMARY OF MAJOR FINDINGS

The findings of the survey by various cross classifications are given as estimates in tables E-1 through E-48; tables E-49 through E-56 give reliability estimates for the basic characteristics and a detailed discussion of their use is given in the reliability of the estimates section. If desired, the estimates by some other classification criteria including more detailed

estimates (e.g., distribution of workers by age and experience at present company in the stone industry working at the plant or mill location) can be derived from the original data base. The following findings are based on the data for the entire 1986 metal and nonmetal mining workforce.

- The total estimated workforce for the 1986 metal and nonmetal industry was approximately 179,800. The breakdown of this employment by the four industry types was as follows: 35,900 in metal, 73,400 in stone, 37,100 in sand and gravel, and 33,400 in nonmetal (table E-1). The data also indicate that only 10 pct of the metal workforce and 23 pct of the nonmetal workforce were employed in establishments with 49 or less employees as compared with 48 and 93 pct for stone, and sand and gravel, respectively. That is, stone, and sand and gravel establishments tend to be smaller in size than metal and nonmetal establishments.
- Of the total 1986 metal and nonmetal industry workforce, mechanic-welder-oiler-machinist was the largest category of workers with 16 pct employment, plant operator-warehouseman made up another 15 pct, truck driver constituted 12 pct, and the laborer-miner-utility man category was 11 pct (table E-2). Each of the remaining occupation groupings had fewer than 10 pct of the employees.
- The distribution of the metal and nonmetal industry workforce was underground mine, 5 pct; surface at underground mine, 2 pct; surface mine, 47 pct; plant or mill, 35 pct; and office, 10 pct (table E-4). Also, the employment distribution for the four nonoffice work locations differed vastly by industry.
- Distribution of the workers by job title varied greatly according to the employment size class (table E-9). This was especially true for the following job title groupings: front-end loader-forklift operator; manager-foreman-supervisor (general); mechanic-welder-oiler-machinist; and truck driver. For example, in the employment size class 1-19, front-end loader-forklift operators made up 17 pct of the total employment while in the 250-499 and 500+ employment size classes, this figure was 2 and 1 pct, respectively. Only 7 pct of the workers in the employment size class 1-19 belonged to the job title category of mechanic-welder-oiler-machinist compared with 23 and 25 pct for employment size classes 250-499 and 500+, respectively.
- Median experience at the present company ranged from 5 yr for truck drivers to 13 yr for manager-foreman-supervisor (working) (table E-19).
- Mean hours of training during the last 2 yr was highest (56) for electrician-lampman category (table E-21).
- Of the female employees, 61 pct had the job title category of office worker, compared with 3 pct of the males (table E-23).
- Median experience at the present job is about 5 yr for all five locations (table E-32). The median experience at the present company and at total mining, however, is lower for workers at the surface mine location than for the workers at the other three nonoffice work locations.

The following findings are based on data that exclude the job title category of office worker.

- The single largest category of equipment operated was handtools (powered and nonpowered) with 16 pct (table E-3). This category was followed closely by equipment categories none, plant equipment, and truck (haulage) with 15, 14, and 13 pct, respectively.
- The median experience at present job, present company, and total mining were 5, 8, and 10 yr, respectively (table E-5).
- Mean job-related training during the last 2 yr was 35 h for workers in the sand and gravel industry, versus 43, 44, and 48 h for workers in the metal, nonmetal, and stone industries, respectively (table E-6).
- Mean age was about 40 yr for workers in all four industries (table E-7).
- Males made up 97 pct of the metal and nonmetal industry workforce (table E-8). Note that the 97-pct figure excludes the unspecified category.
- Whites, blacks, and Hispanics made up 82, 7, and 8 pct, respectively, of the workforce (table E-8). The remaining 3 pct workers belonged either to another race or were unspecified.
- Of those workers whose education was specified, 73 pct had a high school or better education (table E-8). Note that this figure is obtained by (1) summing the workers in the categories high school diploma, vocational diploma, some college, and college degree, and (2) dividing this sum by the total number of workers minus the workers in unspecified category. In this case, it is 113,403 divided by 154,319.
- The median experience at present job, company, and at total mining either increased or stayed the same with the increase in the employment size class (table E-12).
- The distribution of the equipment operated varied considerably between the males and females. This was especially true for the principal equipment categories front-end loader-forklift, handtools, scale-lab equipment-controls, truck (haulage), and none (table E-29). For example, scale-lab equipment-controls was the principal equipment operated category for 31 pct of the females compared with only 4 pct for males. Handtools was the largest principal equipment operated category for males (17 pct) but for females this category was only 3 pct.
- There was a higher percentage of employees with at least a high school education under the age of 40 than there were of age 40 and over (table E-46 and figure 1); proportionately more females had a high school or higher education than males (table E-47 and figure 2); education by race (table E-48) is shown in figure 3.

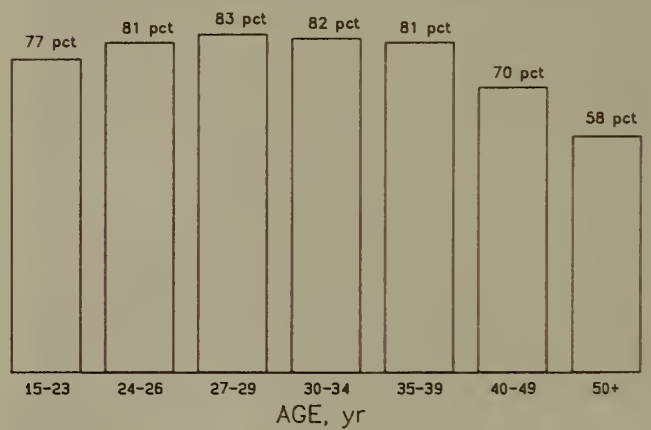

Figure 1.—Percentage of 1986 metal and nonmetal mining workforce with at least a high school diploma, by age (excludes job title category of office workers as well as workers whose education is unspecified).

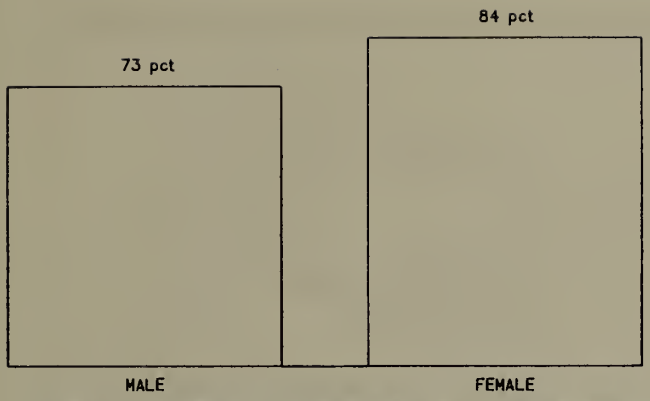

Figure 2.—Percentage of 1986 metal and nonmetal mining workforce with at least a high school diploma, by sex (excludes job title category of office workers as well as workers whose education is unspecified).

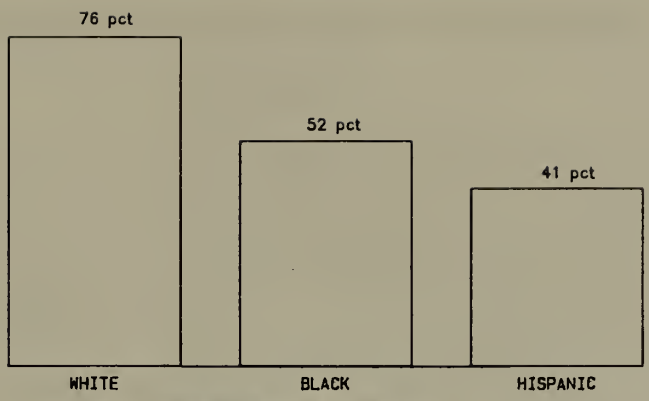

Figure 3.—Percentage of 1986 metal and nonmetal mining workforce with at least a high school diploma, by race (excludes job title category of office workers as well as workers whose education is unspecified).

APPLICATION OF DATA FOR INJURY ANALYSES

The ultimate objective of this study is to provide a basis for—

1. Analyzing the 1986 MSHA metal and nonmetal injury statistics and identifying those subpopulations exhibiting higher or lower than average injury rates.

2. Producing some selected estimates by geographic location such as regions (east, central, west), MSHA districts, or States and performing injury data analyses.

3. Producing some selected estimates by SIC code such as iron, copper, lead-zinc, etc., and performing injury data analyses.

4. Developing an easy to use computerized data base that would be available to the researchers to do their own analyses, especially in the area of targeting injury prevention and training efforts.

The results from these analyses, which encompass all facets of mining operations, can help identify areas where research efforts should be devoted to achieve the greatest safety improvements, thus preventing creation of unnecessary regulations or crash research programs that tend to waste funds.

RECOMMENDATIONS FOR FUTURE WORK

1. After the injury analyses are performed, and the hazardous areas or subpopulations have been identified, it would be desirable to further investigate their problems and needs. This can be accomplished by conducting some special surveys such as an equipment use survey, maintenance-related work survey, small mines survey, etc.

2. Repeat the MIPS and perform the injury analyses periodically, say every 3 to 5 yr, in order to study the changing mining environment and its impact on mining safety and productivity. When the survey is repeated, it is recommended that modifications be made to the questionnaire to reflect new needs. It is also recommended that the collection of total mine experience and job-related training data be eliminated, since these variables are conceptually very hard to measure. Also, the variables experience on the job and experience with the company should be measured in years only.

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APPENDIX A.—METAL AND NONMETAL MINING INDUSTRY JOB TITLE GROUPING

Description	*Job title code*
Backhoe-crane-dragline-shovel operator	367, 378, 778, 387
Beltman-belt repairman	601, 1012, 996
Blaster	807
Deckhand-barge and dredge operator	372
Dozer-heavy and mobile equipment operator	368, 768, 985
Driller-rock bolter	33, 34, 333, 334, 1056, 46
Electrician-lampman	402, 602, 603, 385
Front-end loader-forklift operator	382, 782, 825, 389
Grader-scraper operator	375, 775, 957
Laborer-miner-utility man	616, 53, 316, 36, 38, 39, 45, 57, 58, 59, 158, 216, 224, 327, 386, 395, 609, 624, 663, 710, 716, 874, 997, 1013, 1055
Manager-foreman-supervisor:	
General	430, 449, 481, 489, 494
Maintenance	418
Working	749
Mechanic-welder-oiler-machinist	404, 604, 605, 1019, 1018, 1060, 394, 608
Mine technical support	320, 393, 396, 414, 423, 456, 464, 495, 593, 594 920, 921, 930, 965, 998, 1014
Office worker	497
Plant operator-warehouseman	374, 379, 380, 388, 390, 392, 1022
Shuttle car-tram operator	850, 28, 29, 269, 373, 728, 962, 969
Stone cutter-finisher	398, 399
Truck driver	376, 776

Code	*Description*
28	Scoop tram operator
29	Mucking machine operator
33	Driller helper, underground
34	Exploration driller, underground
	Longhole driller, underground
	Prospect driller, underground
	Diamond driller, underground
36	Continuous miner operator
38	Cutting machine operator
39	Hand loader
	Trammer
45	Hangup man
	Rockman
	Raise blaster
	Chute blaster
	Rock handler
46	Pinner
	Truss bolter
	Rock bolter
	Roof trimmer
	Roof man
	Scaler operator
	Roof bolter
53	Nipper
	Utility man
57	Stope miner
58	DXC miner
	Drift miner
59	Raise miner
158	Rock machine operator, underground
216	Trackman
224	Trainees, underground

Code	*Description*
269	Chute puller, underground
	Locomotive operator
	Car loader, underground
	Whistle punk, underground
316	Service truck operator
	Laborer
	Track gang, surface
	Surface worker
	Utility man, surface
	Pumper, surface
	Tamping machine operator
320	Cage attendant, surface
	Aerial tram—outside only
327	Surface miner
333	Driller helper
334	Carriage-mounted drill operator, surface
	Wagon drill operator, surface
	Churn driller, surface
	Rotary drill operator
	JP drill operator, surface
	Air-track driller, outside only
367	Backhoe operator
	Power shovel operator
	Pitman
368	Dozer operator
	Track operator helper, surface
	Tractor operator, surface
372	Deckhand
	Dredge operator
	Barge attendant
	Barge loader
	Boat operator

Code	Description
373	Car dropper
374	Storekeeper
	Blunger
	Process operator
	Sandbox operator
	Mill operator
	Reagent operator
	Car loader, surface
	Warehouseman
	Shipping
	Media operator
	Breakerman
	Crusher operator
	Sewing machine operator
	Boney preparation plant operator
	Packaging
	Cleaning plant operator
	Truck loader
	Bagger-baler
	Preparation plant operator
	Cobber
375	Grader operator, surface
376	Truck driver, surface
378	Dragline operator
	Dropball operator
	Crane operator, surface
379	Kiln operator
	Calciner
	Dryer operator
380	Fine coal plant operator
382	Loader operator
	Front-end loader operator, surface
	Pan operator
	Scraper operator
	Highlift operator
	Payloader operator
385	Lampman
386	Refuse truck driver
387	Rotary bucket excavator operator
388	Separator operator
	Scalper
	Shaker operator
	Screen operator
389	Forklift operator
390	Silo operator
392	Washery operator
	Topman
	Skip dumper
	Binman
	Scrubber operator
	Tipple operator-attendant
393	Scaleperson
	Weighman-weighmaster
394	Carpenter
395	Water truck operator
396	Watchman
	Security guard
398	Sawyer
	Stone finishing
399	Dimension stone cutter-polisher
402	Master electrician
404	Master mechanic

Code	Description
414	Laboratory assistant
	Analyst
	Laboratory technician
	Laboratory supervisor
	Quality control
	Dust sampler
	Emission control specialist
418	Maintenance supervisor
	Maintenance foreman
423	Surveyor
430	Assistant mine manager
	Assistant mine foreman-vice president
449	Mine owner
	Assayers
	President
	General foreman
	Mine manager
	Mine foreman
456	Engineer
	Metallurgist-Geologist
	Chemist
464	Inspector
481	Superintendents
	Project managers
	Coordinators
	Supervisors
489	Outside foreman
494	Plant manager
	Mill manager
	Plant foreman
	Mill foreman
495	Safety coordinator
	Safety manager
	Safety director
	Environmental coordinator
	Safety engineer
497	Office help
	Computer operator
	Controller
	Clerk
593	Nurse
594	Training specialist
601	Conveyor man
	Belt walker
	Belt installer
	Tunnel worker
	Tailpiece man
	Belt mover
	Mobile bridge carrierman
	Beltman
602	Lineman
	Electrician
603	Electrician helper
604	Fueler
	Boilermaker
	Plumber
	Pipefitter
	Boiler operator
	Pipe man
	Boiler trainee
	Mechanic
	Repairman
	Millwright

Code	Description
605	Mechanic helper
608	Mason
609	Supplyman
	Material man
616	Rock picker
	Parts runner
	Groundman
	Unit helper
	Bathhouse attendant
	Pointman
	Laborer
	Slate picker
	Roustabout
	Extra man
624	Trainees
	Apprentice
663	Ledgeman
	Quarry man
	Miner, not elsewhere classified
	Shaft miner
	Probeman
710	Propman
	Timberman
716	Cement man
	Form man
	Grizzly tender
728	Gizmo operator
	Load-haul-dump operator, underground
749	Shift boss
	Foreman-leadman
	Bullgang foreman
	Labor foreman
	Section boss-foreman
768	Heavy equipment operator
775	Grader operator, underground
776	Truck driver, underground
778	Cherry picker
	Crane operator, underground
	Dragline operator, underground
	Backhoe operator, underground
	Gradall operator
782	Front-end loader operator, underground
807	Chargeman
	Shot firer
	Powder man
	Blaster
	Airdox operator
	Loading hole shooter
	Powder monkey

Code	Description
825	Bobcat operator
850	Ramcar operator
	Shuttle car operator
	Buggy operator
874	Mine equipment operator
920	Cager
921	Hoist operator
	Hoist engineer
	Shaftman
930	Skip tender
957	Scraper operator
962	Car runner, surface
	Trip rider
	Brakeman
	Flagman
	Car rider
	Conductor
965	Dispatcher
969	Swamper
	Motorman
	Switchman
985	Heavy equipment operator, surface
	Mobile equipment operator, surface
996	Feeder man
997	General or many equipment operator
998	Janitor
	Bag stenciler
	Prospector
	Painter
1012	Belt repairman
	Belt vulcanizer
1013	Cleanup man
1014	Sampler
1018	Lube man
	Greaser-oiler
1019	Welder
1022	Dump man
	Dump operator
1055	Chainman
1056	Rock driller
1060	Machinist
	Shopman
	Shop foreman
	Bit sharpener

APPENDIX B.—METAL AND NONMETAL MINING INDUSTRY EQUIPMENT OPERATED GROUPING

Description	*Equipment code*
Backhoe-crane-dragline-shovel	60, 14
Belt	13, 96
Dozer-heavy and mobile equipment	8, 85
Drill (underground)-rock bolter	53, 54, 49
Drill (surface)	9
Explosives	47
Front-end loader-forklift	24, 23
Grader-scraper	52, 57
Handtools (powered and nonpowered)	28
Hoist-elevator	30, 19, 38
Many equipment	97
Miscellaneous utility equipment	95, 12, 16
Plant equipment	40, 7, 10, 11, 15, 18, 22, 26, 32, 39, 46, 51, 58, 69, 82, 83
Pump	48
Scale-lab equipment-controls	92, 80, 91
Shuttle car-locomotive	61, 34, 33, 41, 42, 43, 65
Stone cutting-finishing machine	17
Truck (haulage)	44, 45
Truck (utility)-personnel carrier	67, 37, 66
Welding machine-lathe	70, 5
None	0
Not elsewhere classified	98, 68, 71, 81, 88
Unspecified	99

Code	*Description*
0	None
5	Drill press
	Bench grinder
	Lathe
7	Boats
	Barges
	Water transportation
8	Bulldozer
	Dozer
	Crawler tractor
9	Carriage-mounted drill
	Jumbo drill
	Churn drill
	Rotary drill
	Jet piercing drill
	Airtrack compressor drill
10	Chute
	Airslide
11	Classifier
	Cyclones
12	Continuous miner
	Dosco miner
13	Belt feeder
	Mobile bridge carrier
	Conveyor
	All types belts
14	Cherry picker
	Basket scaler
	Scaling machine
	Rock or dropball
	Boom hoist
	Derrick
	Crane
	Gantry

Code	*Description*
15	Breaker
	Crusher
16	Cutting machines
	Undercutter
	Chain cutter
17	Polishing machinery
	Dimension stone cutting
18	Dredge
19	Elevator
	Buckets
	Cage
	Skip
22	Precipitator heavy media bath
	Filters
	Flotation machines
23	Forklift
24	Highlift
	Skip tender
	Front-end loader
	Payloader
26	Grizzlies
28	Handtools (powered and nonpowered)
	Ram jack
30	Hoist
	Car dropper
	Hydraulic jack
32	Impactor
33	Scoop tram
	Unitrac
	Load-haul-dump
	Teletram car
	Bobcat, underground

Code	Description
34	Locomotive
	Trammer
	Tow-motor
	Lorry car
	Rail-mounted locomotive
37	Porta bus
	Mancar
	Golf cart
	Mantrip
	Rail runner
	Rail rover
	Personnel carrier
	Boss buggy
	Jeep
38	Man lift
	Scaling rig
39	Grinding mills
	Ball or rod mills
40	Milling machinery
	Block press
	General plant equipment
41	Nipper truck, underground
	Mine car, underground
	Underground flatcar
	Timber truck, underground
42	Mine car, surface
	Ore-coal car, surface
	Boxcar, surface
	Hopper car, surface
43	Mucking machine
	Overshot loader
44	Ore haulage trucks, offhighway
45	Payloader ore haulage, onhighway
46	Bagger
	Sewing machine
	Packaging machine
47	Pneumatic blast agent loader
	Pop shooter
	Driller loader
	Prill loader
	Powder buggy
	Explosives
48	Pump
49	Raise borer
51	Raw coal storage
	Tipple
	Dump bins
52	Roadgrader
	Motor grader
	Motor patrol
53	Jackleg
	Drifter drill
	Airleg
	Diamond drill
	Track drill
	Jumbo drill
	Rock drill
	Buzzy drill
	Jackhammer
	Hydraulic drill
	Stoper drill

Code	Description
54	Pinner
	Roof bolting machine
57	Pan scraper
	Scoop, surface
	Self-loading scraper
	Tractor scraper
	Scraper loader
58	Shaker
	Vibrator
	Screen
60	Dragline
	Dragline bucket
	Backhoe
	Power shovel
	Clamshell
61	Buggy
	Shuttle car
	Ram car
65	Track maintenance
	Track repair equipment
66	Tractor, underground
	Elkhorn
	Supply car
67	Trash truck
	Service truck
	Utility truck
	Water truck
	Dump truck
	Pickup truck
68	Tugger
	Air winch
69	Washers
70	Welding machine
	Torch
71	Machines, not elsewhere classified
	Rock rake
	Drilling rigs
	Impact roller
80	Lab equipment
81	Rigs, not elsewhere classified
82	Boilers
83	Furnaces
	Calciners
	Kilns
	Dryers
85	Heavy equipment
	Mobile equipment
88	Diesels
91	Controls
	Consoles
92	Scales
95	Miscellaneous utility equipment
96	Feeders
97	Many-all types of equipment
98	Not elsewhere classified
99	Not specified

APPENDIX C.—ESTIMATION PROCEDURES

Establishment weight.—Suppose one out of every five mine establishments in a sampling stratum (industry-mine type-employment size class-status) was selected. Then, the sampling ratio is 1/5, and the establishment weight (EWT) is 5.00, the inverse of the sampling ratio.

Nonresponse adjustment factor.—Also suppose in a given sampling stratum, 80 pct of the establishments that were within the scope of the survey responded. Then, the nonresponse adjustment factor (NRAF) is 1.25 (i.e., 100/80).

Worker weight.—Additionally, there was the sampling ratio with which the workers in the establishment were sampled; the worker weight (WWT) ranged from 1.00 to 30.00 (see the first page of MIPS questionnaire in appendix F). Theoretically, all the workers in a sampling stratum should have had the same weight. Hence, there would have been no need to assign weight at the worker level, as the worker weight could have been incorporated into the establishment weight. In practice, however, this is seldom the case because for a few establishments the employment level changes from what it was on the sampling frame to the time of the survey data collection. Since all the establishments did not report in the same employment size class that they were sampled in, it was necessary to also assign each worker a weight.

Final weight.—For the purpose of computing the estimates, each worker was assigned a final weight (FWT), which was the product of establishment weight (EWT), nonresponse adjustment factor (NRAF), and the worker weight (WWT). That is, FWT = EWT × NRAF × WWT.

Estimates of number of workers.—The estimates of the total number of workers were computed by (1) summing the final weights over the appropriate domain, and (2) rounding the sum to the nearest integer.

Example: To estimate the total number of truck drivers in the stone industry:

1. Compute $x = \sum_{i \in D} FWT_i$,

Where, the domain D was the set of all records (workers) that had an industry code of stone and occupation code of truck driver.

2. Compute y = round (x).

Estimates of mean.—The estimates of mean age (training) were computed by summing over the appropriate domain (1) the product of age (training) and final weight, (2) the final weights, and then (3) dividing the sum of the products by the sum of the weights and rounding the result to the nearest whole number. It should be noted that for each domain only those entries where age (training) was specified were included in the computation:

Example: The mean age of the blasters in the metal industry was estimated as follows.

1. Compute $x = \sum_{i \in D} (Age_i * FWT_i)$.

2. Compute $y = \sum_{i \in D} FWT_i$.

Where, domain D is the set of all records that had an industry code of metal and an occupation code of blasters, with age being specified.

3. Compute z = round (x/y).

Estimates of median.—The estimates of median job, company, and mining experience were derived by (1) sorting the records within the domain in ascending order of the experience for which the median statistic was desired, (2) computing the total number of workers (NW) in the domain by summing the final weights, and (3) selecting the experience corresponding to the middle worker(s) in the ordering. That is, if NW is an odd number, then the median experience is the experience corresponding to the (NW/2 + 1)th worker in the ordering; if NW is an even number, then the median experience is the midpoint (rounded to the nearest integer) of the experience corresponding to the (NW/2)th and (NW/2 + 1)th worker in the ordering. As with the mean estimates, the median estimates also excluded those entries in the domain with unspecified experience.

APPENDIX D.—RELIABILITY OF ESTIMATES: RANDOM GROUP VARIANCE TECHNIQUE

The random group method of variance estimation employed in this study consisted of selecting eight samples using the same sampling scheme for each sample as the parent sample. The primary sampling units (establishments) were divided into two sets. The first set consisted of noncertainty (probability of selection less than 1.00) primary sampling units sorted by their original industry-mine type-employment size class-status. A random integer, say j, between 1 and 8 was generated. The first primary unit in the ordering was assigned to the random group j, the second to the random group j + 1, and so forth in a modulo 8 fashion. Then, the secondary sampling units (workers) were assigned the same random group number as the primary unit to which they belonged.

The second set consisted of all secondary sampling units belonging to the certainty (probability of selection equal to 1.00) primary sampling units. The secondary sampling units were sorted by the same scheme as above, and a random integer, say k, between 1 and 8 was generated. Then, the first secondary unit in the ordering was assigned to the random group k, the second to the random group k + 1, and so forth in a modulo 8 fashion. Hence, each worker belonged to a random group. For a more detailed discussion of the random group technique, the reader is referred to reference 4 of the main text.

The following procedure was followed in computing the estimated variance (var), standard error (s), and the coefficient of variation (CV) for the estimated number of workers belonging to a particular category.

1. The domain (i.e., category) was defined.
2. A separate estimate for total number of workers, $\hat{\theta}_i$, for each of the eight random groups was computed. If any random group was empty, then a zero was assigned to that random group.
3. Total number of workers, $\hat{\theta}$, for all eight groups was computed as
$$\hat{\theta} = \hat{\theta}_1 + \hat{\theta}_2 + \ldots + \hat{\theta}_8.$$
4. The mean number of workers per group was computed as
$$\bar{\hat{\theta}} = \hat{\theta}/8.$$
5. The variance for $\hat{\theta}$ was computed as
$$\text{var}(\hat{\theta}) = 8 \sum_{i=1}^{8} \frac{(\hat{\theta}_i - \bar{\hat{\theta}})^2}{7}.$$
6. The standard error of $\hat{\theta}$ was computed as
$$s(\hat{\theta}) = \sqrt{\text{var}(\hat{\theta})}.$$
7. The CV for $\hat{\theta}$ was computed as
$$\text{CV}(\hat{\theta}) = \frac{s(\hat{\theta})}{\hat{\theta}} \times 100.0.$$

APPENDIX E.—METAL AND NONMETAL MINING 1986 WORKFORCE ESTIMATES

TABLE E–1.—Metal and nonmetal mining 1986 workforce estimates: employment size class, by type of ore mined

Employment size class[1]	Metal		Stone		Sand and gravel		Nonmetal		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
1–19	1,771	5	18,511	25	25,200	68	3,825	11	49,307	27
20–49	1,695	5	17,215	23	9,117	25	4,062	12	32,088	18
50–99	2,101	6	10,145	14	2,444	7	4,360	13	19,050	11
100–249	7,715	21	23,219	32	339	1	9,049	27	40,322	22
250–499	5,590	16	3,726	5	0	0	5,514	16	14,829	8
500+	17,068	47	540	1	0	0	6,625	20	24,233	13
Total	35,940	100	73,357	100	37,100	100	33,434	100	179,831	100

[1]MSHA size groups are based on the annual average employment of the primary subunit and not on the total employment; hence, MSHA published injury statistics by size groups should not be analyzed against these data.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–2.—Metal and nonmetal mining 1986 workforce estimates: job title, by type of ore mined

Job title grouping[1]	Metal		Stone		Sand and gravel		Nonmetal		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
Backhoe-crane-dragline-shovel operator	557	2	2,118	3	1,279	3	983	3	4,937	3
Beltman-belt repairman	127	0	319	0	208	1	146	0	800	0
Blaster	189	1	336	0	3	0	77	0	605	0
Deckhand-barge and dredge operator	12	0	171	0	853	2	68	0	1,103	1
Dozer-heavy and mobile equipment operator	1,040	3	1,775	2	1,381	4	1,092	3	5,288	3
Driller-rock bolter	1,029	3	2,058	3	56	0	558	2	3,700	2
Electrician-lampman	1,663	5	1,433	2	75	0	608	2	3,780	2
Front-end loader-forklift operator	629	2	6,095	8	5,933	16	1,286	4	13,942	8
Grader-scraper operator	195	1	415	1	352	1	361	1	1,323	1
Laborer-miner-utility man	4,284	12	8,771	12	2,918	8	4,046	12	20,019	11
Manager-foreman-supervisor:										
General	1,558	4	4,543	6	3,466	9	2,152	6	11,719	7
Maintenance	537	1	708	1	40	0	537	2	1,821	1
Working	1,874	5	2,362	3	387	1	1,519	5	6,143	3
Mechanic-welder-oiler-machinist	7,857	22	11,458	16	3,299	9	5,929	18	28,543	16
Mine technical support	4,076	11	4,524	6	1,439	4	3,000	9	13,038	7
Office worker	1,886	5	5,010	7	3,188	9	2,356	7	12,440	7
Plant operator-warehouseman	5,275	15	11,377	16	3,918	11	6,742	20	27,312	15
Shuttle car-tram operator	968	3	213	0	32	0	394	1	1,607	1
Stone cutter-finisher	0	0	864	1	0	0	15	0	879	0
Truck driver	2,184	6	8,808	12	8,274	22	1,565	5	20,830	12
Total	35,940	100	73,357	100	37,100	100	33,434	100	179,831	100

[1]As defined by MSHA; see appendix A for detailed explanation of job title grouping.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E-3.—Metal and nonmetal mining 1986 workforce estimates:[1] principal equipment operated, by type of ore mined

Equipment operated grouping[2]	Metal		Stone		Sand and gravel		Nonmetal		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
Backhoe-crane-dragline-shovel	650	2	2,228	3	1,323	4	887	3	5,088	3
Belt	127	0	404	1	247	1	157	1	936	1
Dozer-heavy and mobile equipment	961	3	1,616	2	1,164	3	1,102	4	4,843	3
Drill (underground)-rock bolter	823	2	485	1	3	0	275	1	1,586	1
Drill (surface)	328	1	1,898	3	52	0	313	1	2,591	2
Explosives	175	1	332	0	3	0	77	0	588	0
Front-end loader-forklift	1,003	3	7,538	11	6,640	20	1,915	6	17,096	10
Grader-scraper	195	1	427	1	400	1	506	2	1,529	1
Handtools (powered and nonpowered)	7,888	23	10,370	15	2,787	8	6,564	21	27,609	16
Hoist-elevator	221	1	36	0	0	0	203	1	460	0
Many equipment	567	2	684	1	326	1	840	3	2,417	1
Miscellaneous utility equipment	2,371	7	5,423	8	1,733	5	1,915	6	11,442	7
Plant equipment	4,036	12	9,105	13	5,045	15	5,304	17	23,489	14
Pump	195	1	168	0	216	1	179	1	758	0
Scale-lab equipment-controls	1,772	5	3,316	5	985	3	1,506	5	7,579	5
Shuttle car-locomotive	1,050	3	312	0	21	0	389	1	1,772	1
Stone cutting-finishing machine	0	0	868	1	0	0	15	0	883	1
Truck (haulage)	2,299	7	9,119	13	8,501	25	1,570	5	21,488	13
Truck (utility)-personnel carrier	1,080	3	989	1	211	1	604	2	2,885	2
Welding machine-lathe	1,632	5	2,904	4	808	2	443	1	5,787	3
None	6,212	18	9,235	14	3,300	10	5,837	19	24,584	15
Not elsewhere classified	294	1	193	0	57	0	145	0	689	0
Unspecified	174	1	695	1	90	0	333	1	1,292	1
Total	34,054	100	68,347	100	33,912	100	31,078	100	167,391	100

[1]Excluding job title category of office workers.
[2]See appendix B for detailed explanation of equipment operated grouping.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E-4.—Metal and nonmetal mining 1986 workforce estimates: work location at mine, by type of ore mined

Work location	Metal		Stone		Sand and gravel		Nonmetal		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
Underground mine	4,980	14	1,094	1	0	0	3,643	11	9,717	5
Surface at underground mine	1,756	5	658	1	0	0	1,783	5	4,197	2
Surface mine	10,992	31	35,742	49	26,631	72	11,208	34	84,572	47
Plant or mill	15,126	42	28,546	39	6,026	16	13,634	41	63,332	35
Office	3,087	9	7,316	10	4,443	12	3,167	9	18,012	10
Total	35,940	100	73,357	100	37,100	100	33,434	100	179,831	100

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E-5.—Metal and nonmetal mining 1986 workforce estimates:[1] experience at job, company, and mining, by type of ore mined

Experience, yr	Metal		Stone		Sand and gravel		Nonmetal		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
At present job:										
0< to ≤1	6,616	19	13,067	19	6,625	20	4,900	16	31,206	19
1< to ≤2	3,665	11	8,365	12	3,812	11	3,681	12	19,523	12
2< to ≤3	2,764	8	6,185	9	3,214	9	2,142	7	14,305	9
3< to ≤5	3,349	10	8,392	12	3,932	12	3,711	12	19,383	12
5< to ≤10	8,223	24	14,212	21	5,856	17	8,197	26	36,488	22
10< to ≤20	6,492	19	9,702	14	4,884	14	5,253	17	26,332	16
20<	2,117	6	3,814	6	2,172	6	841	3	8,943	5
Unspecified	828	2	4,611	7	3,417	10	2,353	8	11,210	7
Total	34,054	100	68,347	100	33,912	100	31,078	100	167,391	100
Median, yr	6	NAp	5	NAp	4	NAp	5	NAp	5	NAp
At present company:										
0< to ≤1	4,312	13	8,741	13	5,818	17	2,375	8	21,245	13
1< to ≤5	5,915	17	16,500	24	10,698	32	6,604	21	39,718	24
5< to ≤10	7,713	23	14,282	21	6,642	20	8,691	28	37,328	22
10< to ≤15	5,568	16	9,269	14	3,934	12	6,108	20	24,878	15
15< to ≤20	5,064	15	6,670	10	2,418	7	2,972	10	17,124	10
20< to ≤25	2,188	6	3,550	5	1,281	4	1,992	6	9,011	5
25< to ≤30	1,482	4	2,867	4	883	3	914	3	6,147	4
30<	1,552	5	4,126	6	999	3	1,387	4	8,064	5
Unspecified	260	1	2,343	3	1,238	4	35	0	3,876	2
Total	34,054	100	68,347	100	33,912	100	31,078	100	167,391	100
Median, yr	10	NAp	8	NAp	5	NAp	9	NAp	8	NAp
Total mining:										
0< to ≤1	1,524	4	6,577	10	3,439	10	1,426	5	12,966	8
1< to ≤5	3,830	11	12,337	18	7,375	22	4,684	15	28,226	17
5< to ≤10	7,141	21	13,951	20	5,852	17	7,505	24	34,448	21
10< to ≤15	6,413	19	9,500	14	3,835	11	5,713	18	25,461	15
15< to ≤20	5,751	17	6,994	10	2,466	7	2,945	9	18,156	11
20< to ≤25	2,740	8	3,955	6	1,361	4	1,723	6	9,779	6
25< to ≤30	1,740	5	3,037	4	912	3	884	3	6,573	4
30<	1,883	6	4,269	6	1,114	3	1,424	5	8,691	5
Unspecified	3,032	9	7,727	11	7,558	22	4,774	15	23,091	14
Total	34,054	100	68,347	100	33,912	100	31,078	100	167,391	100
Median, yr	12	NAp	9	NAp	8	NAp	10	NAp	10	NAp

NAp Not applicable.
[1]Excluding job title category of office workers.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–6.—Metal and nonmetal mining 1986 workforce estimates:[1] training received, by type of ore mined

Job training for last 2 yr, h	Metal			Stone			Sand and gravel			Nonmetal			Total		
	Mean	Workers	pct	Mean	Workers	pct	Mean	Workers	pct	Mean	Workers	pct	Mean	Workers	pct
0	0	1,667	5	0	5,175	8	0	6,132	18	0	2,178	7	0	15,152	9
1–8	7	1,227	4	7	5,879	9	7	2,509	7	7	1,363	4	7	10,979	7
9–15	12	1,132	3	11	3,230	5	11	902	3	12	381	1	12	5,644	3
16	16	5,046	15	16	11,632	17	16	4,238	12	16	7,132	23	16	28,048	17
17–40	26	11,535	34	29	9,985	15	31	3,759	11	28	5,685	18	28	30,965	18
41–80	60	2,691	8	64	5,554	8	67	2,786	8	61	3,609	12	63	14,639	9
81–160	107	924	3	118	3,522	5	120	947	3	111	1,265	4	116	6,658	4
161+	228	2,035	6	390	2,488	4	367	733	2	371	931	3	331	6,188	4
Unspecified	NAp	7,798	23	NAp	20,883	31	NAp	11,905	35	NAp	8,532	27	NAp	49,118	29
Total	43	34,054	100	48	68,347	100	35	33,912	100	44	31,078	100	44	167,391	100

NAp Not applicable.
[1]Excluding job title category of office workers.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–7.—Metal and nonmetal mining 1986 workforce estimates:[1] age distribution, by type of ore mined

Age, yr	Metal			Stone			Sand and gravel			Nonmetal			Total		
	Mean	Workers	pct	Mean	Workers	pct	Mean	Workers	pct	Mean	Workers	pct	Mean	Workers	pct
15–20	20	317	1	19	1,220	2	19	722	2	20	353	1	19	2,612	2
21–23	22	711	2	22	3,214	5	22	1,745	5	22	1,162	4	22	6,831	4
24–26	25	1,433	4	25	4,992	7	25	2,881	8	25	2,400	8	25	11,705	7
27–29	28	2,511	7	28	6,005	9	28	2,920	9	28	3,137	10	28	14,572	9
30–34	32	5,564	16	32	9,988	15	32	4,514	13	32	5,424	17	32	25,490	15
35–39	37	6,171	18	37	9,458	14	37	4,323	13	37	4,881	16	37	24,833	15
40–49	44	9,559	28	44	15,250	22	44	6,583	19	44	6,926	22	44	38,318	23
50+	55	7,482	22	56	16,466	24	57	7,821	23	56	6,632	21	56	38,402	23
Unspecified	NAp	308	1	NAp	1,754	3	NAp	2,404	7	NAp	162	1	NAp	4,627	3
Total	41	34,054	100	40	68,347	100	39	33,912	100	39	31,078	100	40	167,391	100

NAp Not applicable.
[1]Excluding job title category of office workers.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–8.—Metal and nonmetal mining 1986 workforce estimates:[1] sex, race, and education, by type of ore mined

	Metal		Stone		Sand and gravel		Nonmetal		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
Sex:										
Male	32,735	96	66,326	97	32,949	97	29,873	96	161,883	97
Female	1,182	3	1,490	2	790	2	1,061	3	4,523	3
Unspecified	136	0	531	1	174	1	143	0	984	1
Total	34,054	100	68,347	100	33,912	100	31,078	100	167,391	100
Race:										
White	28,798	85	56,171	82	28,644	84	23,327	75	136,940	82
Black	793	2	5,119	7	1,742	5	4,758	15	12,413	7
Hispanic	3,469	10	5,353	8	2,448	7	2,439	8	13,708	8
Other	671	2	1,101	2	456	1	399	1	2,626	2
Unspecified	324	1	603	1	622	2	154	0	1,703	1
Total	34,054	100	68,347	100	33,912	100	31,078	100	167,391	100
Education level:										
Some elementary	1,682	5	6,349	9	2,812	8	2,168	7	13,012	8
Some high school	3,650	11	13,068	19	6,030	18	5,155	17	27,904	17
High school diploma	15,733	46	31,371	46	15,792	47	14,652	47	77,548	46
Vocational diploma	3,243	10	4,520	7	2,171	6	2,563	8	12,498	7
Some college	5,425	16	5,120	7	2,212	7	2,497	8	15,254	9
College degree	3,079	9	2,549	4	879	3	1,596	5	8,103	5
Unspecified	1,242	4	5,370	8	4,015	12	2,445	8	13,072	8
Total	34,054	100	68,347	100	33,912	100	31,078	100	167,391	100

[1]Excluding job title category of office workers.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–9.—Metal and nonmetal mining 1986 workforce estimates: job title, by employment size class[1]

Job title grouping[2]	1–19		20–49		50–99		100–249		250–499		500+		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
Backhoe-crane-dragline-shovel operator	1,806	4	1,022	3	564	3	667	2	399	3	478	2	4,937	3
Beltman-belt repairman	138	0	181	1	54	0	160	0	100	1	167	1	800	0
Blaster	132	0	157	0	27	0	117	0	93	1	80	0	605	0
Deckhand-barge and dredge operator	609	1	237	1	35	0	213	1	10	0	0	0	1,103	1
Dozer-heavy and mobile equipment operator	1,876	4	842	3	479	3	1,070	3	461	3	560	2	5,288	3
Driller-rock bolter	1,128	2	823	3	312	2	734	2	289	2	415	2	3,700	2
Electrician-lampman	99	0	187	1	313	2	1,352	3	537	4	1,291	5	3,780	2
Front-end loader-forklift operator	8,255	17	2,744	9	1,052	6	1,398	3	339	2	155	1	13,942	8
Grader-scraper operator	427	1	335	1	277	1	187	0	28	0	70	0	1,323	1
Laborer-miner-utility man	4,205	9	3,183	10	2,284	12	5,490	14	1,727	12	3,131	13	20,019	11
Manager-foreman-supervisor:														
General	5,135	10	2,358	7	1,071	6	1,836	5	477	3	842	3	11,719	7
Maintenance	83	0	235	1	189	1	672	2	371	3	272	1	1,821	1
Working	383	1	853	3	960	5	1,856	5	739	5	1,352	6	6,143	3
Mechanic-welder-oiler-machinist	3,303	7	4,503	14	3,578	19	7,665	19	3,391	23	6,104	25	28,543	16
Mine technical support	1,933	4	1,725	5	1,371	7	4,006	10	1,336	9	2,668	11	13,038	7
Office worker	3,994	8	2,094	7	1,326	7	2,757	7	941	6	1,327	5	12,440	7
Plant operator-warehouseman	5,658	11	4,602	14	3,253	17	7,480	19	2,621	18	3,697	15	27,312	15
Shuttle car-tram operator	71	0	69	0	152	1	440	1	108	1	767	3	1,607	1
Stone cutter-finisher	268	1	364	1	0	0	248	1	0	0	0	0	879	0
Truck driver	9,806	20	5,575	17	1,753	9	1,974	5	864	6	858	4	20,830	12
Total	49,307	100	32,088	100	19,050	100	40,322	100	14,829	100	24,233	100	179,831	100

[1]MSHA size groups are based on the annual average employment of the primary subunit and not on the total employment; hence, MSHA published injury statistics by size groups should not be analyzed against these data.
[2]As defined by MSHA; see appendix A for detailed explanation of job title grouping.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–10.—Metal and nonmetal mining 1986 workforce estimates:[1] principal equipment operated, by employment size class[2]

Equipment operated grouping[3]	1–19		20–49		50–99		100–249		250–499		500+		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
Backhoe-crane-dragline-shovel	1,876	4	1,067	4	574	3	723	2	354	3	493	2	5,088	3
Belt	159	0	208	1	68	0	212	1	121	1	167	1	936	1
Dozer-heavy and mobile equipment	1,622	4	916	3	474	3	817	2	428	3	586	3	4,843	3
Drill (underground)-rock bolter	285	1	222	1	86	0	393	1	136	1	465	2	1,586	1
Drill (surface)	978	2	695	2	238	1	456	1	165	1	58	0	2,591	2
Explosives	138	0	157	1	29	0	105	0	79	1	80	0	588	0
Front-end loader-forklift	9,248	20	3,209	11	1,351	8	2,271	6	684	5	332	1	17,096	10
Grader-scraper	497	1	377	1	291	2	266	1	28	0	70	0	1,529	1
Handtools (powered and nonpowered)	2,864	6	3,783	13	3,129	18	8,104	22	3,440	25	6,291	27	27,609	16
Hoist-elevator	60	0	5	0	106	1	198	1	28	0	63	0	460	0
Many equipment	877	2	278	1	341	2	229	1	48	0	644	3	2,417	1
Miscellaneous utility equipment	2,194	5	1,981	7	1,198	7	3,544	9	970	7	1,555	7	11,442	7
Plant equipment	6,764	15	4,212	14	2,574	15	5,295	14	2,056	15	2,589	11	23,489	14
Pump	218	0	139	0	103	1	176	0	48	0	75	0	758	0
Scale-lab equipment-controls	1,233	3	1,125	4	851	5	2,473	7	590	4	1,307	6	7,579	5
Shuttle car-locomotive	60	0	99	0	121	1	523	1	129	1	839	4	1,772	1
Stone cutting-finishing machine	306	1	330	1	0	0	248	1	0	0	0	0	883	1
Truck (haulage)	10,100	22	5,661	19	1,789	10	2,074	6	947	7	917	4	21,488	13
Truck (utility)-personnel carrier	325	1	241	1	126	1	635	2	591	4	967	4	2,885	2
Welding machine-lathe	787	2	965	3	857	5	1,422	4	584	4	1,171	5	5,787	3
None	4,579	10	3,928	13	3,174	18	6,750	18	2,266	16	3,888	17	24,584	15
Not elsewhere classified	75	0	117	0	135	1	132	0	70	1	160	1	689	0
Unspecified	70	0	280	1	108	1	520	1	126	1	188	1	1,292	1
Total	45,314	100	29,994	100	17,724	100	37,565	100	13,888	100	22,906	100	167,391	100

[1]Excluding job title category of office workers.
[2]MSHA size groups are based on the annual average employment of the primary subunit and not on the total employment; hence, MSHA published injury statistics by size groups should not be analyzed against these data.
[3] See appendix B for detailed explanation of equipment operated grouping.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–11.—Metal and nonmetal mining 1986 workforce estimates: work location at mine, by employment size class[1]

Work location	1–19		20–49		50–99		100–249		250–499		500+		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
Underground mine	895	2	512	2	967	5	3,243	8	1,062	7	3,038	13	9,717	5
Surface at underground mine	503	1	278	1	273	1	1,017	3	536	4	1,589	7	4,197	2
Surface mine	34,082	69	18,199	57	8,115	43	11,746	29	5,599	38	6,832	28	84,572	47
Plant or mill	8,298	17	9,824	31	7,780	41	20,338	50	6,254	42	10,838	45	63,332	35
Office	5,529	11	3,275	10	1,915	10	3,979	10	1,379	9	1,935	8	18,012	10
Total	49,307	100	32,088	100	19,050	100	40,322	100	14,829	100	24,233	100	179,831	100

[1]MSHA size groups are based on the annual average employment of the primary subunit and not on the total employment; hence, MSHA published injury statistics by size groups should not be analyzed against these data.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–12.—Metal and nonmetal mining 1986 workforce estimates:[1] experience at job, company, and mining, by employment size class[2]

Experience, yr	1–19		20–49		50–99		100–249		250–499		500 +		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
At present job:														
0< to ≤1	9,567	21	6,089	20	3,695	21	7,032	19	1,999	14	2,824	12	31,206	19
1< to ≤2	5,498	12	3,443	11	2,483	14	4,558	12	1,337	10	2,204	10	19,523	12
2< to ≤3	4,554	10	2,235	7	1,652	9	3,462	9	1,050	8	1,353	6	14,305	9
3< to ≤5	5,595	12	3,125	10	1,949	11	5,208	14	1,479	11	2,027	9	19,383	12
5< to ≤10	7,778	17	5,544	18	3,810	21	8,775	23	4,108	30	6,473	28	36,488	22
10< to ≤20	6,686	15	4,231	14	2,060	12	5,012	13	2,137	15	6,205	27	26,332	16
20<	2,791	6	1,940	6	847	5	1,015	3	630	5	1,720	8	8,943	5
Unspecified	2,844	6	3,388	11	1,228	7	2,503	7	1,147	8	100	0	11,210	7
Total	45,314	100	29,994	100	17,724	100	37,565	100	13,888	100	22,906	100	167,391	100
Median, yr	4	NAp	4	NAp	4	NAp	4	NAp	6	NAp	7	NAp	5	NAp
At present company:														
0< to ≤1	8,053	18	5,176	17	2,316	13	3,482	9	670	5	1,549	7	21,245	13
1< to ≤5	15,239	34	8,068	27	5,079	29	7,387	20	2,576	19	1,369	6	39,718	24
5< to ≤10	8,564	19	5,947	20	4,246	24	9,683	26	3,586	26	5,302	23	37,328	22
10< to ≤15	5,160	11	3,717	12	2,181	12	5,843	16	2,204	16	5,773	25	24,878	15
15< to ≤20	2,853	6	2,715	9	1,433	8	4,402	12	1,746	13	3,977	17	17,124	10
20< to ≤25	1,410	3	1,420	5	833	5	1,993	5	1,359	10	1,995	9	9,011	5
25< to ≤30	994	2	1,124	4	504	3	1,604	4	682	5	1,238	5	6,147	4
30<	1,228	3	1,145	4	902	5	2,163	6	1,021	7	1,603	7	8,064	5
Unspecified	1,813	4	681	2	230	1	1,007	3	44	0	100	0	3,876	2
Total	45,314	100	29,994	100	17,724	100	37,565	100	13,888	100	22,906	100	167,391	100
Median, yr	5	NAp	7	NAp	7	NAp	9	NAp	11	NAp	13	NAp	8	NAp
Total mining:														
0< to ≤1	5,181	11	3,535	12	1,438	8	2,210	6	371	3	231	1	12,966	8
1< to ≤5	10,949	24	5,584	19	3,389	19	5,626	15	1,501	11	1,177	5	28,226	17
5< to ≤10	8,292	18	5,130	17	4,216	24	9,197	24	2,994	22	4,619	20	34,448	21
10< to ≤15	5,526	12	3,598	12	2,305	13	5,987	16	2,120	15	5,925	26	25,461	15
15< to ≤20	3,449	8	2,539	8	1,495	8	4,687	12	1,634	12	4,350	19	18,156	11
20< to ≤25	1,902	4	1,219	4	1,009	6	2,302	6	1,173	8	2,174	9	9,779	6
25< to ≤30	1,274	3	1,211	4	565	3	1,553	4	710	5	1,260	5	6,573	4
30<	1,738	4	1,167	4	860	5	2,230	6	1,021	7	1,675	7	8,691	5
Unspecified	7,004	15	6,011	20	2,446	14	3,773	10	2,363	17	1,495	7	23,091	14
Total	45,314	100	29,994	100	17,724	100	37,565	100	13,888	100	22,906	100	167,391	100
Median, yr	7	NAp	8	NAp	8	NAp	10	NAp	12	NAp	14	NAp	10	NAp

NAp Not applicable.

[1]Excluding job title category of office workers.

[2]MSHA size groups are based on the annual average employment of the primary subunit and not on the total employment; hence, MSHA published injury statistics by size groups should not be analyzed against these data.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–13.—Metal and nonmetal mining 1986 workforce estimates:[1] training received, by employment size class[2]

Job training for last 2 yr, h	1–19		20–49		50–99		100–249		250–499		500+		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
0	6,900	15	2,451	8	1,736	10	2,455	7	152	1	1,459	6	15,152	9
1–8	3,612	8	1,967	7	1,346	8	2,266	6	1,072	8	715	3	10,979	7
9–15	1,553	3	465	2	519	3	1,926	5	301	2	881	4	5,644	3
16	5,628	12	5,745	19	3,402	19	7,698	20	2,054	15	3,521	15	28,048	17
17–40	5,886	13	4,896	16	3,317	19	6,796	18	2,824	20	7,246	32	30,965	18
41–80	4,127	9	2,721	9	1,668	9	3,329	9	1,785	13	1,010	4	14,639	9
81–160	2,040	5	846	3	411	2	2,212	6	871	6	277	1	6,658	4
161+	1,352	3	623	2	452	3	1,585	4	464	3	1,711	7	6,188	4
Unspecified	14,216	31	10,280	34	4,872	27	9,299	25	4,365	31	6,086	27	49,118	29
Total	45,314	100	29,994	100	17,724	100	37,565	100	13,888	100	22,906	100	167,391	100
Mean job training, h	42	NAp	39	NAp	43	NAp	48	NAp	51	NAp	45	NAp	44	NAp

NAp Not applicable.
[1]Excluding job title category of office workers.
[2]MSHA size groups are based on the annual average employment of the primary subunit and not on the total employment; hence, MSHA published injury statistics by size groups should not be analyzed against these data.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–14.—Metal and nonmetal mining 1986 workforce estimates:[1] age distribution, by employment size class[2]

Age, yr	1–19		20–49		50–99		100–249		250–499		500+		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
15–20	1,069	2	562	2	345	2	426	1	60	0	150	1	2,612	2
21–23	2,686	6	1,551	5	949	5	1,218	3	246	2	181	1	6,831	4
24–26	4,183	9	2,367	8	1,352	8	2,449	7	663	5	690	3	11,705	7
27–29	4,115	9	2,620	9	1,720	10	3,401	9	1,343	10	1,373	6	14,572	9
30–34	6,379	14	4,409	15	2,899	16	5,949	16	2,416	17	3,438	15	25,490	15
35–39	5,485	12	3,673	12	2,552	14	6,020	16	2,394	17	4,709	21	24,833	15
40–49	8,724	19	6,276	21	3,829	22	9,143	24	3,424	25	6,922	30	38,318	23
50+	10,304	23	7,095	24	3,787	21	8,448	22	3,326	24	5,442	24	38,402	23
Unspecified	2,368	5	1,442	5	291	2	511	1	15	0	0	0	4,627	3
Total	45,314	100	29,994	100	17,724	100	37,565	100	13,888	100	22,906	100	167,391	100
Mean age, yr	39	NAp	40	NAp	39	NAp	40	NAp	41	NAp	42	NAp	40	NAp

NAp Not applicable.
[1]Excluding job title category of office workers.
[2]MSHA size groups are based on the annual average employment of the primary subunit and not on the total employment; hence, MSHA published injury statistics by size groups should not be analyzed against these data.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–15.—Metal and nonmetal mining 1986 workforce estimates:[1] sex, race, and education, by employment size class[2]

	1–19		20–49		50–99		100–249		250–499		500 +		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
Sex:														
Male	43,793	97	29,150	97	17,163	97	36,131	96	13,439	97	22,206	97	161,883	97
Female	1,047	2	590	2	475	3	1,320	4	416	3	675	3	4,523	3
Unspecified	474	1	254	1	86	0	113	0	32	0	25	0	984	1
Total	45,314	100	29,994	100	17,724	100	37,565	100	13,888	100	22,906	100	167,391	100
Race:														
White	39,480	87	24,240	81	13,991	79	29,594	79	10,692	77	18,944	83	136,940	82
Black	1,867	4	2,412	8	2,019	11	3,241	9	1,794	13	1,080	5	12,413	7
Hispanic	2,665	6	2,312	8	1,270	7	3,862	10	1,052	8	2,547	11	13,708	8
Other	857	2	331	1	281	2	636	2	274	2	247	1	2,626	2
Unspecified	444	1	699	2	164	1	231	1	77	1	88	0	1,703	1
Total	45,314	100	29,994	100	17,724	100	37,565	100	13,888	100	22,906	100	167,391	100
Education level:														
Some elementary	4,028	9	3,014	10	1,659	9	2,516	7	668	5	1,126	5	13,012	8
Some high school	8,912	20	5,670	19	3,027	17	5,355	14	2,255	16	2,685	12	27,904	17
High school diploma	22,031	49	12,964	43	7,329	41	17,570	47	6,561	47	11,092	48	77,548	46
Vocational diploma	2,990	7	1,631	5	1,524	9	3,259	9	1,368	10	1,725	8	12,498	7
Some college	2,768	6	1,819	6	1,439	8	4,176	11	1,876	14	3,176	14	15,254	9
College degree	1,311	3	959	3	911	5	2,449	7	1,077	8	1,397	6	8,103	5
Unspecified	3,273	7	3,936	13	1,835	10	2,240	6	83	1	1,705	7	13,072	8
Total	45,314	100	29,994	100	17,724	100	37,565	100	13,888	100	22,906	100	167,391	100

[1]Excluding job title category of office workers.
[2]MSHA size groups are based on the annual average employment of the primary subunit and not on the total employment; hence, MSHA published injury statistics by size groups should not be analyzed against these data.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E-16.—Metal and nonmetal mining 1986 workforce estimates: job title, by principal equipment operated,[1] number of workers

Job title grouping[2]	Backhoe crane dragline shovel	Belt	Dozer heavy and mobile equipment	Drill (underground) rock bolter	Drill (surface)	Explosives	Front-end loader forklift	Grader scraper	Handtools (powered and nonpowered)
Backhoe-crane-dragline-shovel operator	4,667	0	60	0	0	0	42	0	40
Beltman-belt repairman	0	767	3	0	0	0	0	0	3
Blaster	0	0	0	0	0	559	0	0	0
Deckhand-barge and dredge operator	3	7	0	0	0	0	7	0	26
Dozer-heavy and mobile equipment operator	93	0	4,217	8	0	0	495	143	0
Driller-rock bolter	7	0	0	1,216	2,363	17	8	0	22
Electrician-lampman	0	0	0	0	0	0	0	0	3,780
Front-end loader-forklift operator	0	0	50	0	0	0	13,851	0	0
Grader-scraper operator	0	0	0	0	0	0	0	1,323	0
Laborer-miner-utility man	39	48	208	320	164	6	1,088	37	765
Manager-foreman-supervisor:									
General	115	11	120	0	6	0	422	17	9
Maintenance	3	0	0	0	0	0	0	0	4
Working	9	0	65	3	7	6	159	6	81
Mechanic-welder-oiler-machinist	75	0	0	0	14	0	0	0	22,570
Mine technical support	30	0	6	0	18	0	11	0	194
Office worker	0	0	0	0	0	0	0	0	0
Plant operator-warehouseman	46	103	115	25	20	0	984	0	115
Shuttle car-tram operator	0	0	0	0	0	0	0	0	0
Stone cutter-finisher	0	0	0	13	0	0	6	0	0
Truck driver	0	0	0	0	0	0	21	2	0
Total	5,088	936	4,843	1,586	2,591	588	17,096	1,529	27,609

Job title grouping[2]	Hoist elevator	Many equipment	Misc. utility equipment	Plant equipment	Pump	Scale lab equipment controls	Shuttle car locomotive	Stone cutting finishing machine	Truck haulage
Backhoe-crane-dragline-shovel operator	0	7	41	21	0	0	20	0	0
Beltman-belt repairman	0	0	0	20	7	0	0	0	0
Blaster	0	0	0	0	0	0	0	0	0
Deckhand-barge and dredge operator	0	0	75	871	5	0	0	0	0
Dozer-heavy and mobile equipment operator	38	16	0	21	0	0	0	0	256
Driller-rock bolter	8	5	0	0	0	0	0	0	0
Electrician-lampman	0	0	0	0	0	0	0	0	0
Front-end loader-forklift operator	0	25	0	0	0	0	0	0	16
Grader-scraper operator	0	0	0	0	0	0	0	0	0
Laborer-miner-utility man	47	1,851	11,326	783	430	29	312	51	248
Manager-foreman-supervisor:									
General	0	433	0	421	27	82	0	0	91
Maintenance	0	0	0	0	0	0	0	0	0
Working	0	46	0	213	0	25	7	6	22
Mechanic-welder-oiler-machinist	0	0	0	61	0	2	0	0	0
Mine technical support	277	6	0	52	23	6,788	25	0	17
Office worker	0	0	0	0	0	73	0	0	0
Plant operator-warehouseman	25	20	0	20,903	267	653	135	7	30
Shuttle car-tram operator	66	0	0	123	0	0	1,274	0	7
Stone cutter-finisher	0	0	0	0	0	0	0	819	0
Truck driver	0	7	0	0	0	0	0	0	20,801
Total	460	2,417	11,442	23,489	758	7,652	1,772	883	21,488

See explanatory notes at end of table.

TABLE E–16.—Metal and nonmetal mining 1986 workforce estimates: job title, by principal equipment operated,[1] number of workers—Con.

Job title grouping[2]	Truck (utility) personnel carrier	Welding machine lathe	None	Not elsewhere classified	Unspecified	Total
Backhoe-crane-dragline-shovel operator	0	0	39	0	0	4,937
Beltman-belt repairman	0	0	0	0	0	800
Blaster	0	0	46	0	0	605
Deckhand-barge and dredge operator	0	0	0	28	82	1,103
Dozer-heavy and mobile equipment operator	0	0	0	0	0	5,288
Driller-rock bolter	10	0	37	7	0	3,700
Electrician-lampman	0	0	0	0	0	3,780
Front-end loader-forklift operator	0	0	0	0	0	13,942
Grader-scraper operator	0	0	0	0	0	1,323
Laborer-miner-utility man	1,111	0	699	260	196	20,019
Manager-foreman-supervisor:						
General	394	16	9,556	0	0	11,719
Maintenance	154	6	1,654	0	0	1,821
Working	497	14	4,908	6	63	6,143
Mechanic-welder-oiler-machinist	24	5,745	0	53	0	28,543
Mine technical support	474	0	4,939	87	92	13,038
Office worker	86	0	12,278	3	0	12,440
Plant operator-warehouseman	206	7	2,557	235	860	27,312
Shuttle car-tram operator	15	0	109	13	0	1,607
Stone cutter-finisher	0	0	40	0	0	879
Truck driver	0	0	0	0	0	20,830
Total	2,971	5,787	36,862	691	1,292	179,831

[1]See appendix B for detailed explanation of equipment operated grouping.
[2]As defined by MSHA; see appendix A for detailed explanation of job title grouping.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–17.—Metal and nonmetal mining 1986 workforce estimates: job title, by work location at mine, number of workers

Job title grouping[1]	Underground mine	Surface at underground mine	Surface mine	Plant or mill	Office	Total
Backhoe-crane-dragline-shovel operator	10	41	4,440	447	0	4,937
Beltman-belt repairman	20	40	322	417	0	800
Blaster	170	0	428	7	0	605
Deckhand-barge and dredge operator	0	13	999	92	0	1,103
Dozer-heavy and mobile equipment operator	37	168	4,607	476	0	5,288
Driller-rock bolter	1,269	39	2,351	42	0	3,700
Electrician-lampman	188	171	1,130	2,291	0	3,780
Front-end loader-forklift operator	226	127	11,067	2,523	0	13,942
Grader-scraper operator	46	7	1,236	35	0	1,323
Laborer-miner-utility man	2,734	498	9,853	6,934	0	20,019
Manager-foreman-supervisor:						
General	616	182	6,824	3,338	758	11,719
Maintenance	179	95	564	937	45	1,821
Working	559	134	2,130	3,244	76	6,143
Mechanic-welder-oiler-machinist	1,551	1,473	13,229	12,290	0	28,543
Mine technical support	401	720	2,681	5,101	4,134	13,038
Office worker	0	0	0	0	12,440	12,440
Plant operator-warehouseman	279	287	3,548	22,639	559	27,312
Shuttle car-tram operator	1,062	14	269	262	0	1,607
Stone cutter-finisher	0	0	329	550	0	879
Truck driver	370	188	18,565	1,707	0	20,830
Total	9,717	4,197	84,572	63,332	18,012	179,831

[1]As defined by MSHA; see appendix A for detailed explanation of job title grouping.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–18.—Metal and nonmetal mining 1986 workforce estimates: job title, by years of experience at job

Job title grouping[1]	0< to ≤1	1< to ≤2	2< to ≤3	3< to ≤5	5< to ≤10	10< to ≤20	20<	Unspecified	Total	Median, yr
Backhoe-crane-dragline-shovel operator	723	557	444	481	1,134	877	433	287	4,937	6
Beltman-belt repairman	341	71	61	47	141	79	30	30	800	2
Blaster	86	129	67	62	157	81	10	13	605	4
Deckhand-barge and dredge operator	196	177	113	169	244	105	41	58	1,103	4
Dozer-heavy and mobile equipment operator	861	605	428	552	1,168	847	333	494	5,288	5
Driller-rock bolter	688	488	276	522	808	573	103	243	3,700	5
Electrician-lampman	481	251	264	322	1,160	1,035	196	72	3,780	8
Front-end loader-forklift operator	2,259	1,681	1,437	1,801	2,644	2,259	939	922	13,942	5
Grader-scraper operator	256	129	121	191	319	217	21	71	1,323	5
Laborer-miner-utility man	6,256	2,666	1,875	2,076	3,479	2,083	489	1,095	20,019	3
Manager-foreman-supervisor:										
General	1,122	981	858	1,275	2,592	2,565	1,467	859	11,719	8
Maintenance	224	128	194	233	573	310	36	124	1,821	6
Working	911	516	514	674	1,722	1,178	328	298	6,143	6
Mechanic-welder-oiler-machinist	3,962	2,949	2,123	2,966	7,509	5,661	1,780	1,594	28,543	6
Mine technical support	2,527	1,655	1,276	1,672	3,037	1,635	601	636	13,038	4
Office worker	1,969	1,508	1,253	1,404	2,710	1,901	826	869	12,440	5
Plant operator-warehouseman	5,722	3,485	2,245	3,645	5,550	3,774	1,008	1,883	27,312	4
Shuttle car-tram operator	269	241	112	247	518	161	53	5	1,607	5
Stone cutter-finisher	156	45	38	123	146	110	72	189	879	5
Truck driver	4,168	2,771	1,860	2,326	3,588	2,779	1,003	2,336	20,830	4
Total	33,176	21,032	15,558	20,787	39,198	28,233	9,769	12,079	179,831	5

[1]As defined by MSHA; see appendix A for detailed explanation of job title grouping.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–19.—Metal and nonmetal mining 1986 workforce estimates: job title, by years of experience at company

Job title grouping[1]	0< to ≤1	1< to ≤5	5< to ≤10	10< to ≤15	15< to ≤20	20< to ≤25	25< to ≤30	30<	Unspecified	Total	Median, yr
Backhoe-crane-dragline-shovel operator	481	1,148	1,007	731	561	378	242	349	40	4,937	10
Beltman-belt repairman	137	142	234	126	86	11	27	28	10	800	7
Blaster	50	165	158	101	38	63	17	14	0	605	8
Deckhand-barge and dredge operator	115	287	328	167	52	40	14	19	83	1,103	7
Dozer-heavy and mobile equipment operator	566	1,301	1,039	934	539	348	118	225	218	5,288	9
Driller-rock bolter	555	973	918	564	398	94	67	61	70	3,700	7
Electrician-lampman	236	562	905	754	620	308	164	184	48	3,780	11
Front-end loader-forklift operator	1,707	3,983	2,922	1,760	1,319	640	507	651	454	13,942	7
Grader-scraper operator	236	346	275	253	110	35	42	27	0	1,323	7
Laborer-miner-utility man	4,567	4,954	4,570	2,613	1,226	663	458	467	500	20,019	6
Manager-foreman-supervisor:											
General	545	2,168	2,327	1,968	1,495	970	731	1,184	331	11,719	12
Maintenance	87	369	464	229	227	211	125	69	41	1,821	10
Working	297	806	1,310	1,111	914	604	363	661	77	6,143	13
Mechanic-welder-oiler-machinist	2,890	5,550	6,690	4,883	3,641	1,631	1,175	1,473	610	28,543	10
Mine technical support	1,624	3,313	3,111	1,889	1,189	676	466	611	160	13,038	7
Office worker	1,616	3,179	3,075	1,919	877	577	394	450	353	12,440	7
Plant operator-warehouseman	3,013	6,626	6,553	4,138	2,774	1,443	930	1,361	475	27,312	8
Shuttle car-tram operator	293	169	562	262	130	84	49	57	0	1,607	8
Stone cutter-finisher	123	208	177	92	13	39	96	68	63	879	7
Truck driver	3,724	6,648	3,780	2,302	1,793	773	558	555	697	20,830	5
Total	22,861	42,897	40,403	26,797	18,001	9,587	6,541	8,514	4,229	179,831	8

[1]As defined by MSHA; see appendix A for detailed explanation of job title grouping.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E-20.—Metal and nonmetal mining 1986 workforce estimates: job title, by years of mining experience

Job title grouping[1]	0< to ≤1	1< to ≤5	5< to ≤10	10< to ≤15	15< to ≤20	20< to ≤25	25< to ≤30	30<	Unspecified	Total	Median, yr
Backhoe-crane-dragline-shovel operator	317	727	971	794	622	430	289	404	383	4,937	12
Beltman-belt repairman	82	90	255	123	119	7	27	22	74	800	10
Blaster	43	120	123	108	40	44	17	14	96	605	8
Deckhand-barge and dredge operator	77	224	324	186	68	24	32	13	156	1,103	8
Dozer-heavy and mobile equipment operator	320	888	1,073	873	607	416	156	241	713	5,288	11
Driller-rock bolter	264	653	865	693	531	136	118	76	366	3,700	10
Electrician-lampman	136	458	883	760	617	292	136	238	261	3,780	12
Front-end loader-forklift operator	844	2,877	2,920	1,892	1,480	652	502	797	1,979	13,942	9
Grader-scraper operator	142	246	253	250	91	44	42	27	229	1,323	8
Laborer-miner-utility man	3,198	3,995	4,309	2,612	1,387	826	480	556	2,655	20,019	7
Manager-foreman-supervisor:											
General	177	1,017	1,762	2,158	1,584	1,124	840	1,371	1,686	11,719	15
Maintenance	6	202	348	221	255	204	171	86	328	1,821	15
Working	87	364	1,028	1,112	992	634	355	630	941	6,143	16
Mechanic-welder-oiler-machinist	1,686	4,126	6,165	4,919	3,881	1,729	1,202	1,490	3,346	28,543	11
Mine technical support	1,067	2,344	2,856	1,944	1,192	709	522	731	1,674	13,038	9
Office worker	1,048	2,278	2,605	1,673	866	668	408	552	2,342	12,440	9
Plant operator-warehouseman	1,777	4,817	6,231	4,177	2,887	1,652	1,005	1,358	3,409	27,312	10
Shuttle car-tram operator	20	128	582	455	149	137	61	54	21	1,607	11
Stone cutter-finisher	105	122	72	89	7	39	26	20	399	879	6
Truck driver	2,619	4,827	3,428	2,096	1,648	680	593	565	4,374	20,830	7
Total	14,014	30,504	37,053	27,134	19,022	10,448	6,981	9,242	25,433	179,831	10

[1]As defined by MSHA; see appendix A for detailed explanation of job title grouping.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E-21.—Metal and nonmetal mining 1986 workforce estimates: job title, by hours of training received in last 2 yr

Job title grouping[1]	0	1–8	9–15	16	17–40	41–80	81–160	161+	Unspecified	Total	Mean, h
Backhoe-crane-dragline-shovel operator	455	289	144	818	631	395	212	230	1,764	4,937	49
Beltman-belt repairman	85	76	47	156	71	66	11	10	278	800	25
Blaster	68	24	6	146	104	75	35	19	128	605	48
Deckhand-barge and dredge operator	175	40	18	159	177	123	62	28	321	1,103	41
Dozer-heavy and mobile equipment operator	519	321	157	1,063	851	456	129	240	1,552	5,288	45
Driller-rock bolter	374	143	73	866	423	506	162	171	983	3,700	53
Electrician-lampman	297	189	104	879	767	235	146	289	874	3,780	56
Front-end loader-forklift operator	1,663	1,148	387	2,175	2,278	1,185	580	343	4,182	13,942	39
Grader-scraper operator	120	110	28	359	149	100	3	15	440	1,323	28
Laborer-miner-utility man	1,560	1,326	858	3,512	3,386	1,711	837	772	6,058	20,019	45
Manager-foreman-supervisor:											
General	1,465	549	362	1,925	1,688	1,037	562	264	3,867	11,719	40
Maintenance	92	154	18	235	326	311	96	34	555	1,821	44
Working	465	403	72	1,005	1,388	703	343	316	1,448	6,143	51
Mechanic-welder-oiler-machinist	1,891	1,635	1,045	5,311	6,538	2,160	1,039	1,396	7,529	28,543	52
Mine technical support	1,110	865	436	1,722	2,671	994	630	412	4,198	13,038	42
Office worker	2,389	801	301	959	1,177	869	382	361	5,203	12,440	44
Plant operator-warehouseman	2,110	1,825	1,136	4,099	6,084	2,564	1,108	1,121	7,265	27,312	42
Shuttle car-tram operator	141	61	0	452	247	369	15	38	284	1,607	39
Stone cutter-finisher	139	184	30	13	66	40	12	6	389	879	24
Truck driver	2,422	1,639	723	3,151	3,121	1,609	675	486	7,004	20,830	35
Total	17,541	11,780	5,945	29,006	32,142	15,508	7,040	6,549	54,321	179,831	44

[1]As defined by MSHA; see appendix A for detailed explanation of job title grouping.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–22.—Metal and nonmetal mining 1986 workforce estimates: job title, by years of age

Job title grouping[1]	15–20	21–23	24–26	27–29	30–34	35–39	40–49	50+	Unspecified	Total	Mean, yr
Backhoe-crane-dragline-shovel operator	58	119	400	349	587	620	1,114	1,619	71	4,937	43
Beltman-belt repairman	17	17	35	120	128	129	196	140	17	800	39
Blaster	7	48	32	41	128	36	130	168	17	605	41
Deckhand-barge and dredge operator	9	60	81	115	225	140	213	207	54	1,103	38
Dozer-heavy and mobile equipment operator	10	104	272	455	834	870	1,281	1,263	200	5,288	41
Driller-rock bolter	81	94	226	393	655	658	800	698	96	3,700	39
Electrician-lampman	9	83	44	183	687	854	945	948	26	3,780	42
Front-end loader-forklift operator	287	629	1,116	1,280	1,949	1,814	2,788	3,370	709	13,942	40
Grader-scraper operator	40	53	102	135	237	156	346	215	38	1,323	38
Laborer-miner-utility man	860	1,688	2,241	2,277	3,523	2,657	3,446	2,845	481	20,019	36
Manager-foreman-supervisor:											
General	6	79	285	482	1,242	1,786	3,343	4,132	363	11,719	45
Maintenance	0	6	20	8	171	244	744	604	24	1,821	45
Working	17	29	99	287	883	971	1,953	1,870	35	6,143	44
Mechanic-welder-oiler-machinist	252	642	1,535	2,510	4,554	4,984	7,301	6,309	458	28,543	40
Mine technical support	167	595	868	1,143	2,127	1,954	2,961	3,035	190	13,038	40
Office worker	211	414	655	1,047	1,746	2,131	2,962	2,908	367	12,440	41
Plant operator-warehouseman	381	1,310	2,273	2,645	4,225	3,942	5,939	6,131	467	27,312	39
Shuttle car-tram operator	0	7	107	188	220	359	421	286	18	1,607	39
Stone cutter-finisher	13	71	61	101	108	100	212	213	0	879	40
Truck driver	400	1,198	1,907	1,862	3,007	2,560	4,185	4,348	1,362	20,830	39
Total	2,823	7,245	12,360	15,619	27,236	26,965	41,280	41,309	4,994	179,831	40

[1]As defined by MSHA; see appendix A for detailed explanation of job title grouping.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–23.—Metal and nonmetal mining 1986 workforce estimates: job title, by sex

Job title grouping[1]	Male		Female		Unspecified		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct
Backhoe-crane-dragline-shovel operator	4,879	3	47	0	11	1	4,937	3
Beltman-belt repairman	783	0	17	0	0	0	800	0
Blaster	580	0	26	0	0	0	605	0
Deckhand-barge and dredge operator	1,088	1	15	0	0	0	1,103	1
Dozer-heavy and mobile equipment operator	5,233	3	8	0	46	4	5,288	3
Driller-rock bolter	3,635	2	14	0	51	5	3,700	2
Electrician-lampman	3,774	2	0	0	6	1	3,780	2
Front-end loader-forklift operator	13,725	8	108	1	109	10	13,942	8
Grader-scraper operator	1,318	1	0	0	6	1	1,323	1
Laborer-miner-utility man	19,215	11	637	6	166	16	20,019	11
Manager-foreman-supervisor:								
General	11,416	7	198	2	105	10	11,719	7
Maintenance	1,821	1	0	0	0	0	1,821	1
Working	6,080	4	19	0	43	4	6,143	3
Mechanic-welder-oiler-machinist	28,313	17	139	1	91	9	28,543	16
Mine technical support	10,880	7	2,118	18	41	4	13,038	7
Office worker	5,362	3	6,999	61	79	7	12,440	7
Plant operator-warehouseman	26,299	16	873	8	141	13	27,312	15
Shuttle car-tram operator	1,534	1	68	1	5	0	1,607	1
Stone cutter-finisher	873	1	6	0	0	0	879	0
Truck driver	20,437	12	231	2	162	15	20,830	12
Total	167,245	100	11,522	100	1,063	100	179,831	100

[1]As defined by MSHA; see appendix A for detailed explanation of job title grouping.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E-24.—Metal and nonmetal mining 1986 workforce estimates: job title, by race

Job title grouping[1]	White		Black		Hispanic		Other		Unspecified		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
Backhoe-crane-dragline-shovel operator	4,170	3	354	3	321	2	61	2	32	2	4,937	3
Beltman-belt repairman	557	0	165	1	60	0	11	0	7	0	800	0
Blaster	465	0	12	0	75	1	53	2	0	0	605	0
Deckhand-barge and dredge operator	961	1	132	1	11	0	0	0	0	0	1,103	1
Dozer-heavy and mobile equipment operator.	4,278	3	397	3	358	3	178	6	77	4	5,288	3
Driller-rock bolter	3,015	2	252	2	278	2	93	3	62	3	3,700	2
Electrician-lampman	3,302	2	109	1	355	3	10	0	4	0	3,780	2
Front-end loader-forklift operator	11,612	8	985	8	1,012	7	206	7	126	7	13,942	8
Grader-scraper operator	1,086	1	53	0	154	1	16	1	14	1	1,323	1
Laborer-miner-utility man	14,382	10	2,324	18	2,687	19	396	14	229	12	20,019	11
Manager-foreman-supervisor:												
General	10,722	7	383	3	315	2	128	5	171	9	11,719	7
Maintenance	1,680	1	38	0	68	0	25	1	10	1	1,821	1
Working	5,311	4	314	2	428	3	41	1	49	3	6,143	3
Mechanic-welder-oiler-machinist	23,873	16	1,512	12	2,555	18	421	15	183	10	28,543	16
Mine technical support	11,425	8	566	4	786	6	165	6	96	5	13,038	7
Office worker	11,423	8	259	2	405	3	178	6	176	9	12,440	7
Plant operator-warehouseman	20,914	14	3,242	26	2,538	18	402	14	216	11	27,312	15
Shuttle car-tram operator	1,307	1	121	1	131	1	32	1	16	1	1,607	1
Stone cutter-finisher	648	0	186	1	33	0	6	0	6	0	879	0
Truck driver	17,231	12	1,268	10	1,542	11	382	14	407	22	20,830	12
Total	148,363	100	12,672	100	14,113	100	2,803	100	1,879	100	179,831	100

[1]As defined by MSHA; see appendix A for detailed explanation of job title grouping.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E-25.—Metal and nonmetal mining 1986 workforce estimates: job title, by education

Job title grouping[1]	Some elementary		Some high school		High school diploma		Vocational diploma		Some college		College degree		Unspecified		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
Backhoe-crane-dragline-shovel operator	562	11	1,293	26	2,290	46	312	6	238	5	15	0	227	5	4,937	3
Beltman-belt repairman	51	6	275	34	345	43	22	3	52	6	0	0	55	7	800	0
Blaster	86	14	107	18	278	46	66	11	68	11	0	0	0	0	605	0
Deckhand-barge and dredge operator	72	6	226	20	662	60	74	7	23	2	22	2	25	2	1,103	1
Dozer-heavy and mobile equipment operator.	486	9	964	18	2,799	53	274	5	356	7	48	1	361	7	5,288	3
Driller-rock bolter	412	11	900	24	1,622	44	251	7	267	7	46	1	201	5	3,700	2
Electrician-lampman	67	2	233	6	1,263	33	1,189	31	651	17	154	4	223	6	3,780	2
Front-end loader-forklift operator	1,397	10	2,899	21	6,869	49	768	6	532	4	143	1	1,334	10	13,942	8
Grader-scraper operator	122	9	270	20	649	49	51	4	32	2	0	0	200	15	1,323	1
Laborer-miner-utility man	2,168	11	3,704	19	9,403	47	1,088	5	1,452	7	312	2	1,892	9	20,019	11
Manager-foreman-supervisor:																
General	474	4	1,120	10	4,807	41	655	6	1,844	16	2,001	17	817	7	11,719	7
Maintenance	78	4	153	8	726	40	192	11	313	17	217	12	143	8	1,821	1
Working	258	4	749	12	2,754	45	412	7	834	14	760	12	376	6	6,143	3
Mechanic-welder-oiler-machinist	1,806	6	4,272	15	13,223	46	3,773	13	2,810	10	419	1	2,239	8	28,543	16
Mine technical support	452	3	1,068	8	4,624	35	594	5	2,353	18	3,302	25	645	5	13,038	7
Office worker	32	0	260	2	4,517	36	801	6	3,307	27	2,977	24	546	4	12,440	7
Plant operator-warehouseman	2,310	8	4,545	17	13,819	51	1,647	6	2,361	9	494	2	2,135	8	27,312	15
Shuttle car-tram operator	192	12	255	16	813	51	126	8	161	10	25	2	35	2	1,607	1
Stone cutter-finisher	135	15	315	36	374	43	6	1	19	2	6	1	24	3	879	0
Truck driver	1,884	9	4,555	22	10,228	49	997	5	888	4	138	1	2,140	10	20,830	12
Total	13,044	7	28,164	16	82,065	46	13,298	7	18,561	10	11,081	6	13,618	8	179,831	100

[1]As defined by MSHA; see appendix A for detailed explanation of job title grouping.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–26.—Metal and nonmetal mining 1986 workforce estimates:[1] principal equipment operated, by years of experience at job

Equipment operated grouping[2]	0< to ≤1	1< to ≤2	2< to ≤3	3< to ≤5	5< to ≤10	10< to ≤20	20<	Unspecified	Total	Median, yr
Backhoe-crane-dragline-shovel	713	521	454	518	1,142	960	508	272	5,088	6
Belt	367	79	67	54	165	120	43	40	936	3
Dozer-heavy and mobile equipment	893	558	380	539	1,032	738	319	385	4,843	5
Drill (underground)-rock bolter	307	252	94	339	324	213	13	45	1,586	4
Drill (surface)	485	280	203	253	654	416	118	183	2,591	5
Explosives	97	129	67	67	131	74	10	13	588	3
Front-end loader-forklift	2,937	2,097	1,694	2,262	3,325	2,649	1,031	1,101	17,096	5
Grader-scraper	294	151	134	215	367	266	32	71	1,529	5
Handtools (powered and nonpowered)	3,899	2,797	2,090	2,988	7,348	5,546	1,470	1,468	27,609	6
Hoist-elevator	30	14	36	118	134	97	24	8	460	7
Many equipment	391	258	316	224	471	475	120	161	2,417	5
Miscellaneous utility equipment	3,867	1,609	929	1,088	1,812	1,022	326	789	11,442	2
Plant equipment	4,920	3,053	1,988	3,182	4,612	3,148	913	1,674	23,489	4
Pump	171	99	43	116	176	85	41	27	758	4
Scale-lab equipment-controls	1,522	947	804	807	1,602	1,041	357	499	7,579	4
Shuttle car-locomotive	432	280	118	207	512	162	56	5	1,772	4
Stone cutting-finishing machine	180	51	44	116	139	104	52	195	883	5
Truck (haulage)	4,297	2,854	1,943	2,379	3,721	2,870	1,057	2,366	21,488	4
Truck (utility)-personnel carrier	441	231	349	321	847	448	164	84	2,885	6
Welding machine-lathe	831	587	384	439	1,498	1,276	535	237	5,787	7
None	3,599	2,498	1,937	2,915	6,103	4,399	1,718	1,418	24,584	6
Not elsewhere classified	158	32	96	120	146	76	11	51	689	4
Unspecified	376	145	136	119	228	147	25	117	1,292	3
Total	31,206	19,523	14,305	19,383	36,488	26,332	8,943	11,210	167,391	5

[1]Excluding job title category of office workers.
[2]See appendix B for detailed explanation of equipment operated grouping.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–27.—Metal and nonmetal mining 1986 workforce estimates:[1] principal equipment operated, by hours of training received in last 2 yr

Equipment operated grouping[2]	0	1–8	9–15	16	17–40	41–80	81–160	161+	Unspecified	Total	Mean, h
Backhoe-crane-dragline-shovel	506	282	162	885	720	394	229	221	1,687	5,088	47
Belt	88	84	54	177	114	76	17	30	296	936	36
Dozer-heavy and mobile equipment	410	255	135	887	889	398	106	181	1,583	4,843	46
Drill (underground)-rock bolter	274	28	0	377	241	120	49	98	399	1,586	60
Drill (surface)	178	121	74	539	299	424	106	81	769	2,591	46
Explosives	62	19	13	146	93	80	29	19	128	588	50
Front-end loader-forklift	1,982	1,393	558	2,674	2,816	1,438	677	622	4,937	17,096	43
Grader-scraper	157	110	34	403	160	163	3	15	484	1,529	27
Handtools (powered and nonpowered)	1,800	1,557	869	5,266	6,248	2,036	1,047	1,570	7,217	27,609	55
Hoist-elevator	110	0	6	199	68	13	33	11	20	460	29
Many equipment	135	193	52	742	261	171	109	71	684	2,417	40
Miscellaneous utility equipment	835	804	550	1,647	2,003	959	454	355	3,836	11,442	40
Plant equipment	1,764	1,616	819	3,514	5,138	2,430	1,039	988	6,181	23,489	46
Pump	79	30	51	187	218	59	20	0	114	758	22
Scale-lab equipment-controls	662	521	353	951	1,637	622	293	192	2,347	7,579	39
Shuttle car-locomotive	82	61	7	488	341	375	72	32	316	1,772	40
Stone cutting-finishing machine	132	144	30	13	59	46	25	44	389	883	53
Truck (haulage)	2,516	1,724	746	3,312	3,209	1,616	695	486	7,184	21,488	34
Truck (utility)-personnel carrier	262	303	60	603	474	339	111	253	481	2,885	49
Welding machine-lathe	534	315	300	1,048	1,209	498	233	187	1,462	5,787	41
None	2,433	1,329	676	3,718	4,393	2,129	1,236	667	8,006	24,584	42
Not elsewhere classified	74	13	49	135	159	90	21	10	137	689	30
Unspecified	78	79	47	139	216	161	54	57	461	1,292	53
Total	15,152	10,979	5,644	28,048	30,965	14,639	6,656	6,188	49,118	167,391	44

[1]Excluding job title category of office workers.
[2]See appendix B for detailed explanation of equipment operated grouping.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–28.—Metal and nonmetal mining 1986 workforce estimates:[1] principal equipment operated, by years of age

Equipment operated grouping[2]	15–20	21–23	24–26	27–29	30–34	35–39	40–49	50+	Unspecified	Total	Mean, yr
Backhoe-crane-dragline-shovel	48	121	352	384	599	627	1,162	1,708	87	5,088	43
Belt	17	17	35	120	135	162	241	182	27	936	40
Dozer-heavy and mobile equipment	10	129	288	488	717	786	1,213	1,130	82	4,843	41
Drill (underground)-rock bolter	46	13	75	128	422	364	350	188	0	1,586	37
Drill (surface)	37	119	157	272	382	319	580	623	102	2,591	40
Explosives	12	42	32	32	121	41	117	161	29	588	41
Front-end loader-forklift	352	771	1,336	1,635	2,581	2,232	3,384	3,984	821	17,096	39
Grader-scraper	40	60	111	153	275	170	403	279	38	1,529	39
Handtools (powered and nonpowered)	200	672	1,392	2,453	4,643	5,148	6,765	5,944	392	27,609	40
Hoist-elevator	0	0	17	40	55	49	152	147	0	460	44
Many equipment	29	84	242	184	430	429	468	445	106	2,417	38
Miscellaneous utility equipment	662	937	1,378	1,356	1,980	1,453	1,851	1,516	310	11,442	35
Plant equipment	348	1,239	2,028	2,397	3,786	3,411	4,802	4,946	533	23,489	39
Pump	5	30	77	106	113	92	163	171	0	758	39
Scale-lab equipment-controls	105	472	533	673	1,077	1,190	1,896	1,519	113	7,579	39
Shuttle car-locomotive	0	20	98	210	215	332	484	408	5	1,772	40
Stone cutting-finishing machine	32	77	68	95	114	93	212	192	0	883	39
Truck (haulage)	405	1,252	1,951	1,890	3,091	2,681	4,329	4,514	1,376	21,488	39
Truck (utility)-personnel carrier	6	92	106	223	411	307	856	853	31	2,885	43
Welding machine-lathe	73	112	342	375	776	862	1,660	1,472	114	5,787	41
None	147	482	888	1,194	3,222	3,898	6,834	7,504	417	24,584	43
Not elsewhere classified	25	28	83	36	91	90	175	147	13	689	39
Unspecified	15	61	116	127	254	98	220	370	31	1,292	40
Total	2,612	6,831	11,705	14,572	25,490	24,833	38,318	38,402	4,627	167,391	40

[1]Excluding job title category of office workers.
[2]See appendix B for detailed explanation of equipment operated grouping.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–29.—Metal and nonmetal mining 1986 workforce estimates:[1] principal equipment operated, by sex

Equipment operated grouping[2]	Male		Female		Unspecified		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct
Backhoe-crane-dragline-shovel	5,040	3	36	1	11	1	5,088	3
Belt	919	1	17	0	0	0	936	1
Dozer-heavy and mobile equipment	4,820	3	0	0	23	2	4,843	3
Drill (underground)-rock bolter	1,566	1	14	0	7	1	1,586	1
Drill (surface)	2,528	2	0	0	63	6	2,591	2
Explosives	562	0	26	1	0	0	588	0
Front-end loader-forklift	16,728	10	223	5	145	15	17,096	10
Grader-scraper	1,522	1	0	0	7	1	1,529	1
Handtools (powered and nonpowered)	27,392	17	126	3	91	9	27,609	16
Hoist-elevator	408	0	46	1	6	1	460	0
Many equipment	2,382	1	30	1	5	1	2,417	1
Miscellaneous utility equipment	10,830	7	513	11	99	10	11,442	7
Plant equipment	22,821	14	505	11	163	17	23,489	14
Pump	752	0	6	0	0	0	758	0
Scale-lab equipment-controls	6,155	4	1,420	31	3	0	7,579	5
Shuttle car-locomotive	1,747	1	20	0	5	1	1,772	1
Stone cutting-finishing machine	877	1	6	0	0	0	883	1
Truck (haulage)	21,075	13	243	5	169	17	21,488	13
Truck (utility)-personnel carrier	2,794	2	85	2	6	1	2,885	2
Welding machine-lathe	5,757	4	23	1	7	1	5,787	3
None	23,326	14	1,097	24	161	16	24,584	15
Not elsewhere classified	658	0	31	1	0	0	689	0
Unspecified	1,225	1	55	1	12	1	1,292	1
Total	161,883	100	4,523	100	984	100	167,391	100

[1]Excluding job title category of office workers.
[2]See appendix B for detailed explanation of equipment operated grouping.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–30.—Metal and nonmetal mining 1986 workforce estimates:[1] principal equipment operated, by race

Equipment operated grouping[2]	White		Black		Hispanic		Other		Unspecified		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
Backhoe-crane-dragline-shovel	4,400	3	307	2	281	2	67	3	32	2	5,088	3
Belt	675	0	168	1	78	1	7	0	7	0	936	1
Dozer-heavy and mobile equipment	3,860	3	369	3	378	3	177	7	60	3	4,843	3
Drill (underground)-rock bolter	1,240	1	108	1	171	1	53	2	13	1	1,586	1
Drill (surface)	2,103	2	249	2	150	1	40	2	49	3	2,591	2
Explosives	450	0	12	0	81	1	45	2	0	0	588	0
Front-end loader-forklift	14,150	10	1,326	11	1,258	9	197	7	166	10	17,096	10
Grader-scraper	1,258	1	86	1	155	1	16	1	14	1	1,529	1
Handtools (powered and nonpowered)	22,955	17	1,608	13	2,535	18	323	12	188	11	27,609	16
Hoist-elevator	286	0	113	1	61	0	0	0	0	0	460	0
Many equipment	2,002	1	76	1	286	2	41	2	12	1	2,417	1
Miscellaneous utility equipment	7,816	6	1,526	12	1,713	12	248	9	140	8	11,442	7
Plant equipment	18,334	13	2,560	21	1,984	14	388	15	223	13	23,489	14
Pump	586	0	93	1	75	1	0	0	4	0	758	0
Scale-lab equipment-controls	6,577	5	304	2	543	4	101	4	53	3	7,579	5
Shuttle car-locomotive	1,403	1	109	1	195	1	51	2	16	1	1,772	1
Stone cutting-finishing machine	686	1	146	1	33	0	6	0	12	1	883	1
Truck (haulage)	17,745	13	1,293	10	1,660	12	382	15	407	24	21,488	13
Truck (utility)-personnel carrier	2,299	2	166	1	335	2	72	3	13	1	2,885	2
Welding machine-lathe	4,978	4	204	2	468	3	128	5	9	1	5,787	3
None	21,774	16	1,256	10	1,042	8	241	9	271	16	24,584	15
Not elsewhere classified	516	0	111	1	53	0	9	0	0	0	689	0
Unspecified	844	1	226	2	173	1	34	1	15	1	1,292	1
Total	136,940	100	12,413	100	13,708	100	2,626	100	1,703	100	167,391	100

[1]Excluding job title category of office workers.
[2]See appendix B for detailed explanation of equipment operated grouping.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E-31.—Metal and nonmetal mining 1986 workforce estimates:[1] principal equipment operated, by education

Equipment operated grouping[2]	Some elementary		Some high school		High school diploma		Vocational diploma		Some college		College degree		Unspecified		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
Backhoe-crane-dragline-shovel	593	12	1,301	26	2,429	48	239	5	285	6	15	0	226	4	5,088	3
Belt	65	7	280	30	431	46	38	4	48	5	0	0	73	8	936	1
Dozer-heavy and mobile equipment	407	8	807	17	2,659	55	252	5	341	7	41	1	336	7	4,843	3
Drill (underground)-rock bolter	176	11	348	22	772	49	113	7	126	8	44	3	7	0	1,586	1
Drill (surface)	296	11	670	26	1,097	42	148	6	165	6	3	0	213	8	2,591	2
Explosives	80	14	118	20	256	44	66	11	68	12	0	0	0	0	588	0
Front-end loader-forklift	1,609	9	3,363	20	8,572	50	973	6	840	5	198	1	1,541	9	17,096	10
Grader-scraper	148	10	315	21	776	51	51	3	38	2	0	0	200	13	1,529	1
Handtools (powered and nonpowered)	1,484	5	3,866	14	12,417	45	4,221	15	2,982	11	483	2	2,156	8	27,609	16
Hoist-elevator	85	18	124	27	160	35	47	10	23	5	8	2	14	3	460	0
Many equipment	82	3	337	14	1,034	43	159	7	160	7	128	5	516	21	2,417	1
Miscellaneous utility equipment	1,486	13	2,125	19	5,344	47	570	5	826	7	166	1	924	8	11,442	7
Plant equipment	2,031	9	4,206	18	11,859	50	1,366	6	1,776	8	425	2	1,827	8	23,489	14
Pump	45	6	182	24	350	46	42	6	56	7	19	2	63	8	758	0
Scale-lab equipment-controls	147	2	703	9	3,382	45	471	6	1,430	19	945	12	501	7	7,579	5
Shuttle car-locomotive	168	9	272	15	962	54	125	7	179	10	25	1	42	2	1,772	1
Stone cutting-finishing machine	135	15	288	33	393	44	6	1	25	3	6	1	30	3	883	1
Truck (haulage)	1,946	9	4,715	22	10,543	49	1,022	5	959	4	144	1	2,159	10	21,488	13
Truck (utility)-personnel carrier	178	6	368	13	1,482	51	169	6	360	12	240	8	88	3	2,885	2
Welding machine-lathe	429	7	786	14	2,615	45	806	14	629	11	141	2	382	7	5,787	3
None	1,178	5	2,380	10	9,076	37	1,494	6	3,801	15	5,036	20	1,619	7	24,584	15
Not elsewhere classified	79	11	144	21	270	39	66	10	82	12	6	1	42	6	689	0
Unspecified	164	13	206	16	668	52	52	4	54	4	33	3	115	9	1,292	1
Total	13,012	8	27,904	17	77,548	46	12,498	7	15,254	9	8,103	5	13,072	8	167,391	100

[1]Excluding job title category of office workers.
[2]See appendix B for detailed explanation of equipment operated grouping.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–32.—Metal and nonmetal mining 1986 workforce estimates job, company, and mining experience, by work location

Experience, yr	Underground mine		Surface at underground mine		Surface mine		Plant or mill		Office		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
At present job:												
0< to ≤1	1,893	19	471	11	16,152	19	11,608	18	3,051	17	33,176	18
1< to ≤2	1,171	12	583	14	9,815	12	7,268	11	2,194	12	21,032	12
2< to ≤3	939	10	369	9	7,561	9	4,966	8	1,723	10	15,558	9
3< to ≤5	1,515	16	640	15	8,968	11	7,554	12	2,110	12	20,787	12
5< to ≤10	2,629	27	1,085	26	17,221	20	14,306	23	3,957	22	39,198	22
10< to ≤20	1,353	14	863	21	13,088	15	10,226	16	2,703	15	28,233	16
20<	68	1	123	3	5,109	6	3,305	5	1,164	6	9,769	5
Unspecified	149	2	63	2	6,658	8	4,099	6	1,109	6	12,079	7
Total	9,717	100	4,197	100	84,572	100	63,332	100	18,012	100	179,831	100
Median, yr	5	NAp	6	NAp	5	NAp	5	NAp	5	NAp	5	NAp
At present company:												
0< to ≤1	1,459	15	584	14	12,249	14	6,168	10	2,402	13	22,861	13
1< to ≤5	2,038	21	804	19	22,644	27	12,725	20	4,685	26	42,897	24
5< to ≤10	3,090	32	976	23	17,026	20	14,918	24	4,394	24	40,403	22
10< to ≤15	1,454	15	694	17	12,044	14	9,999	16	2,606	14	26,797	15
15< to ≤20	912	9	390	9	7,581	9	7,773	12	1,345	7	18,001	10
20< to ≤25	454	5	259	6	3,917	5	4,159	7	799	4	9,587	5
25< to ≤30	122	1	133	3	2,792	3	2,929	5	566	3	6,541	4
30<	161	2	312	7	3,797	4	3,466	5	778	4	8,514	5
Unspecified	27	0	44	1	2,524	3	1,197	2	437	2	4,229	2
Total	9,717	100	4,197	100	84,572	100	63,332	100	18,012	100	179,831	100
Median, yr	8	NAp	9	NAp	7	NAp	10	NAp	7	NAp	8	NAp
Total mining:												
0< to ≤1	321	3	110	3	7,918	9	4,055	6	1,610	9	14,014	8
1< to ≤5	1,278	13	529	13	16,222	19	8,967	14	3,508	19	30,504	17
5< to ≤10	2,805	29	612	15	15,899	19	14,065	22	3,672	20	37,053	21
10< to ≤15	1,940	20	670	16	12,269	15	9,946	16	2,308	13	27,134	15
15< to ≤20	1,340	14	587	14	7,992	9	7,748	12	1,355	8	19,022	11
20< to ≤25	664	7	362	9	4,272	5	4,244	7	906	5	10,448	6
25< to ≤30	216	2	244	6	3,080	4	2,879	5	561	3	6,981	4
30<	275	3	450	11	4,210	5	3,427	5	880	5	9,242	5
Unspecified	878	9	632	15	12,709	15	8,001	13	3,213	18	25,433	14
Total	9,717	100	4,197	100	84,572	100	63,332	100	18,012	100	179,831	100
Median, yr	11	NAp	15	NAp	9	NAp	11	NAp	9	NAp	10	NAp

NAp Not applicable.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E-33.—Metal and nonmetal mining 1986 workforce estimates training received, by work location

Job training for last 2 hr, h	Underground mine		Surface at underground mine		Surface mine		Plant or mill		Office		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
0	625	6	200	5	8,937	11	4,581	7	3,197	18	17,541	10
1–8	369	4	411	10	5,703	7	4,040	6	1,257	7	11,780	7
9–15	27	0	198	5	2,312	3	2,946	5	463	3	5,945	3
16	3,208	33	1,026	24	13,623	16	9,573	15	1,576	9	29,006	16
17–40	1,569	16	466	11	12,695	15	15,406	24	2,006	11	32,142	18
41–80	1,272	13	515	12	7,571	9	4,881	8	1,269	7	15,508	9
81–160	365	4	307	7	3,359	4	2,409	4	599	3	7,040	4
161+	371	4	159	4	2,923	3	2,667	4	429	2	6,549	4
Unspecified	1,912	20	914	22	27,450	32	16,830	27	7,215	40	54,321	30
Total	9,717	100	4,197	100	84,572	100	63,332	100	18,012	100	179,831	100
Mean training, h	43	NAp	47	NAp	43	NAp	46	NAp	39	NAp	44	NAp

NAp Not applicable.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E-34.—Metal and nonmetal mining 1986 workforce estimates age distribution, by work location

Age, yr	Underground mine		Surface at underground mine		Surface mine		Plant or mill		Office		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
15–20	100	1	19	0	1,472	2	930	1	301	2	2,823	2
21–23	174	2	41	1	4,164	5	2,184	3	681	4	7,245	4
24–26	606	6	219	5	6,613	8	3,915	6	1,008	6	12,360	7
27–29	1,121	12	378	9	7,236	9	5,439	9	1,446	8	15,619	9
30–34	1,935	20	558	13	12,493	15	9,739	15	2,511	14	27,236	15
35–39	1,965	20	495	12	11,529	14	9,962	16	3,013	17	26,965	15
40–49	2,205	23	1,160	28	18,047	21	15,730	25	4,138	23	41,280	23
50+	1,586	16	1,326	32	19,509	23	14,498	23	4,390	24	41,309	23
Unspecified	27	0	0	0	3,508	4	934	1	524	3	4,994	3
Total	9,717	100	4,197	100	84,572	100	63,332	100	18,012	100	179,831	100
Mean age, yr	38	NAp	43	NAp	40	NAp	40	NAp	41	NAp	40	NAp

NAp Not applicable.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–35.—Metal and nonmetal mining 1986 workforce estimates sex, race, and education, by work location

	Underground mine		Surface at underground mine		Surface mine		Plant or mill		Office		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
Sex:												
Male	9,493	98	4,029	96	82,850	98	61,463	97	9,410	52	167,245	93
Female	165	2	118	3	1,196	1	1,529	2	8,513	47	11,522	6
Unspecified	59	1	49	1	526	1	340	1	89	0	1,063	1
Total	9,717	100	4,197	100	84,572	100	63,332	100	18,012	100	179,831	100
Race:												
White	8,425	87	3,707	88	69,452	82	50,300	79	16,479	91	148,363	83
Black	246	3	220	5	5,349	6	6,541	10	317	2	12,672	7
Hispanic	773	8	198	5	7,140	8	5,253	8	749	4	14,113	8
Other	194	2	48	1	1,521	2	812	1	229	1	2,803	2
Unspecified	80	1	24	1	1,110	1	426	1	239	1	1,879	1
Total	9,717	100	4,197	100	84,572	100	63,332	100	18,012	100	179,831	100
Education level:												
Some elementary	921	9	278	7	7,483	9	4,238	7	125	1	13,044	7
Some high school	1,530	16	482	11	15,955	19	9,560	15	637	4	28,164	16
High school diploma	4,462	46	1,975	47	39,540	47	29,515	47	6,573	36	82,065	46
Vocational diploma	974	10	486	12	5,575	7	5,240	8	1,024	6	13,298	7
Some college	759	8	413	10	6,006	7	6,917	11	4,465	25	18,561	10
College degree	565	6	227	5	2,615	3	3,248	5	4,426	25	11,081	6
Unspecified	507	5	336	8	7,398	9	4,614	7	762	4	13,618	8
Total	9,717	100	4,197	100	84,572	100	63,332	100	18,012	100	179,831	100

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–36.—Metal and nonmetal mining 1986 workforce estimates:[1] experience at job, by hours of training received in last 2 yr

Experience at present job, yr	0	1–8	9–15	16	17–40	41–80	81–160	161 +	Unspecified	Total	Mean, h
0< to ≤1:											
Workers	2,417	3,197	1,114	2,780	7,175	2,936	1,607	1,702	8,280	31,206	54
pct	8	10	4	9	23	9	5	5	27	100	NAp
1< to ≤2:											
Workers	1,531	1,010	522	3,251	3,930	2,306	918	1,193	4,862	19,523	56
pct	8	5	3	17	20	12	5	6	25	100	NAp
2< to ≤3:											
Workers	1,501	872	442	2,536	2,000	1,357	881	952	3,765	14,305	59
pct	10	6	3	18	14	9	6	7	26	100	NAp
3< to ≤5:											
Workers	2,177	1,211	721	3,477	3,389	1,728	856	639	5,186	19,383	43
pct	11	6	4	18	17	9	4	3	27	100	NAp
5< to ≤10:											
Workers	3,541	2,234	1,306	7,882	6,490	3,314	1,309	768	9,644	36,488	33
pct	10	6	4	22	18	9	4	2	26	100	NAp
10< to ≤20:											
Workers	2,702	1,413	1,031	5,401	5,182	2,150	910	530	7,013	26,332	34
pct	10	5	4	21	20	8	3	2	27	100	NAp
20<:											
Workers	916	533	306	2,010	1,990	603	112	187	2,286	8,943	31
pct	10	6	3	22	22	7	1	2	26	100	NAp
Unspecified:											
Workers	369	507	202	713	810	246	65	217	8,082	11,210	47
pct	3	5	2	6	7	2	1	2	72	100	NAp
Total:											
Workers	15,152	10,979	5,644	28,048	30,965	14,639	6,658	6,188	49,118	167,391	44
pct	9	7	3	17	18	9	4	4	29	100	NAp

NAp Not applicable.
[1]Excluding job title category of office workers.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E-37.—Metal and nonmetal mining 1986 workforce estimates:[1] experience at job, by years of age

Experience at present job, yr	15–20	21–23	24–26	27–29	30–34	35–39	40–49	50+	Unspecified	Total	Mean, yr
0< to ≤1:											
Workers	1,677	3,304	4,192	4,052	5,401	3,826	4,831	2,954	970	31,206	34
pct	5	11	13	13	17	12	15	9	3	100	NAp
1< to ≤2:											
Workers	458	1,294	2,142	2,226	3,900	2,800	3,657	2,598	448	19,523	36
pct	2	7	11	11	20	14	19	13	2	100	NAp
2< to ≤3:											
Workers	185	892	1,470	1,695	2,347	2,349	2,989	2,073	306	14,305	37
pct	1	6	10	12	16	16	21	14	2	100	NAp
3< to ≤5:											
Workers	140	636	1,652	1,981	3,669	3,493	4,034	3,399	379	19,383	38
pct	1	3	9	10	19	18	21	18	2	100	NAp
5< to ≤10:											
Workers	0	242	1,585	3,578	6,324	6,700	9,417	8,149	494	36,488	41
pct	0	1	4	10	17	18	26	22	1	100	NAp
10< to ≤20:											
Workers	0	0	0	220	2,380	4,238	9,291	9,728	474	26,332	46
pct	0	0	0	1	9	16	35	37	2	100	NAp
20<:											
Workers	0	0	0	0	0	48	1,808	6,988	100	8,943	55
pct	0	0	0	0	0	1	20	78	1	100	NAp
Unspecified:											
Workers	152	463	664	820	1,471	1,378	2,292	2,513	1,457	11,210	40
pct	1	4	6	7	13	12	20	22	13	100	NAp
Total:											
Workers	2,612	6,831	11,705	14,572	25,490	24,833	38,318	38,402	4,627	167,391	40
pct	2	4	7	9	15	15	23	23	3	100	NAp

NAp Not applicable.
[1]Excluding job title category of office workers.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E-38.—Metal and nonmetal mining 1986 workforce estimates:[1] experience at job, by sex

Experience at present job, yr	Male		Female		Unspecified		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct
0< to ≤1	29,726	18	1,228	27	252	26	31,206	19
1< to ≤2	18,861	12	585	13	77	8	19,523	12
2< to ≤3	13,741	8	472	10	92	9	14,305	9
3< to ≤5	18,854	12	470	10	60	6	19,383	12
5< to ≤10	35,218	22	1,154	26	116	12	36,488	22
10< to ≤20	25,860	16	309	7	163	17	26,332	16
20<	8,809	5	64	1	70	7	8,943	5
Unspecified	10,814	7	241	5	155	16	11,210	7
Total	161,883	100	4,523	100	984	100	167,391	100
Median, yr	5	NAp	3	NAp	3	NAp	5	NAp

NAp Not applicable.
[1]Excluding job title category of office workers.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–39.—Metal and nonmetal mining 1986 workforce estimates:[1] experience at job, by race

Experience at present job, yr	White		Black		Hispanic		Other		Unspecified		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
0< to ≤1	25,388	19	2,183	18	2,581	19	527	20	527	31	31,206	19
1< to ≤2	15,525	11	1,319	11	1,976	14	504	19	200	12	19,523	12
2< to ≤3	11,866	9	832	7	1,205	9	299	11	104	6	14,305	9
3< to ≤5	15,859	12	1,450	12	1,722	13	274	10	79	5	19,383	12
5< to ≤10	29,475	22	2,710	22	3,517	26	559	21	226	13	36,488	22
10< to ≤20	21,885	16	2,280	18	1,727	13	277	11	163	10	26,332	16
20<	7,874	6	515	4	386	3	71	3	98	6	8,943	5
Unspecified	9,068	7	1,125	9	596	4	115	4	306	18	11,210	7
Total	136,940	100	12,413	100	13,708	100	2,626	100	1,703	100	167,391	100
Median, yr	5	NAp	5	NAp	5	NAp	3	NAp	2	NAp	5	NAp

NAp Not applicable.
[1]Excluding job title category of office workers.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–40.—Metal and nonmetal mining 1986 workforce estimates:[1] experience at job, by education

Experience at present job, yr	Some elementary		Some high school		High school diploma		Vocational diploma		Some college		College degree		Unspecified		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
0< to ≤1	1,639	13	5,060	18	15,296	20	2,599	21	3,155	21	1,674	21	1,785	14	31,206	19
1< to ≤2	1,060	8	3,273	12	9,298	12	1,339	11	1,862	12	1,140	14	1,551	12	19,523	12
2< to ≤3	883	7	2,405	9	6,956	9	1,008	8	1,557	10	821	10	675	5	14,305	9
3< to ≤5	1,500	12	3,175	11	8,889	11	1,768	14	1,884	12	1,093	13	1,075	8	19,383	12
5< to ≤10	3,031	23	5,888	21	16,934	22	2,921	23	3,626	24	1,925	24	2,163	17	36,488	22
10< to ≤20	2,752	21	4,841	17	12,246	16	1,958	16	2,132	14	813	10	1,590	12	26,332	16
20<	1,366	10	1,832	7	3,865	5	401	3	523	3	361	4	595	5	8,943	5
Unspecified	781	6	1,432	5	4,065	5	503	4	514	3	276	3	3,638	28	11,210	7
Total	13,012	100	27,904	100	77,548	100	12,498	100	15,254	100	8,103	100	13,072	100	167,391	100
Median, yr	7	NAp	5	NAp	5	NAp	5	NAp	4	NAp	4	NAp	5	NAp	5	NAp

NAp Not applicable.
[1]Excluding job title category of office workers.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–41.—Metal and nonmetal mining 1986 workforce estimates:[1] experience at company, by hours of training received in last 2 yr

Experience at present company, yr	0	1–8	9–15	16	17–40	41–80	81–160	161+	Unspecified	Total	Mean, h
0< to ≤1:											
Workers	1,965	2,821	1,145	1,509	4,003	2,006	728	712	6,356	21,245	43
pct	9	13	5	7	19	9	3	3	30	100	NAp
1< to ≤5:											
Workers	3,922	2,209	1,066	5,203	6,030	4,186	1,987	2,191	12,922	39,718	60
pct	10	6	3	13	15	11	5	6	33	100	NAp
5< to ≤10:											
Workers	3,544	2,199	1,150	7,940	6,439	3,748	1,580	1,300	9,428	37,328	42
pct	9	6	3	21	17	10	4	3	25	100	NAp
10< to ≤15:											
Workers	2,240	1,470	744	4,878	4,622	1,986	1,119	773	7,045	24,878	39
pct	9	6	3	20	19	8	4	3	28	100	NAp
15< to ≤20:											
Workers	1,449	920	593	3,126	4,492	1,211	591	390	4,352	17,124	34
pct	8	5	3	18	26	7	3	2	25	100	NAp
20< to ≤25:											
Workers	494	550	362	1,893	2,022	619	211	208	2,651	9,011	31
pct	5	6	4	21	22	7	2	2	29	100	NAp
25< to ≤30:											
Workers	481	233	247	1,568	1,280	322	167	177	1,674	6,147	35
pct	8	4	4	26	21	5	3	3	27	100	NAp
30<:											
Workers	800	486	216	1,770	1,640	363	263	262	2,263	8,064	33
pct	10	6	3	22	20	5	3	3	28	100	NAp
Unspecified:											
Workers	258	90	122	160	436	199	11	174	2,427	3,876	78
pct	7	2	3	4	11	5	0	4	63	100	NAp
Total:											
Workers	15,152	10,979	5,644	28,048	30,965	14,639	6,658	6,188	49,118	167,391	44
pct	9	7	3	17	18	9	4	4	29	100	NAp

NAp Not applicable.
[1]Excluding job title category of office workers.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E-42.—Metal and nonmetal mining 1986 workforce estimates:[1] experience at company, by years of age

Experience at present company, yr	15–20	21–23	24–26	27–29	30–34	35–39	40–49	50+	Unspecified	Total	Mean, yr
0< to ≤1:											
Workers	1,584	2,940	3,171	2,359	2,799	2,191	3,045	2,197	960	21,245	33
pct	7	14	15	11	13	10	14	10	5	100	NAp
1< to ≤5:											
Workers	955	3,485	5,502	5,170	6,774	5,306	6,618	4,466	1,442	39,718	35
pct	2	9	14	13	17	13	17	11	4	100	NAp
5< to ≤10:											
Workers	0	298	2,733	6,083	8,879	6,370	7,230	5,132	603	37,328	37
pct	0	1	7	16	24	17	19	14	2	100	NAp
10< to ≤15:											
Workers	0	0	0	733	6,162	6,533	6,444	4,705	302	24,878	41
pct	0	0	0	3	25	26	26	19	1	100	NAp
15< to ≤20:											
Workers	0	0	0	0	456	3,784	7,818	4,900	166	17,124	46
pct	0	0	0	0	3	22	46	29	1	100	NAp
20< to ≤25:											
Workers	0	0	0	0	0	357	4,764	3,833	56	9,011	49
pct	0	0	0	0	0	4	53	43	1	100	NAp
25< to ≤30:											
Workers	0	0	0	0	0	0	1,549	4,516	82	6,147	54
pct	0	0	0	0	0	0	25	73	1	100	NAp
30<:											
Workers	0	0	0	0	0	0	195	7,818	51	8,064	58
pct	0	0	0	0	0	0	2	97	1	100	NAp
Unspecified:											
Workers	74	108	299	228	421	291	655	835	966	3,876	40
pct	2	3	8	6	11	8	17	22	25	100	NAp
Total:											
Workers	2,612	6,831	11,705	14,572	25,490	24,833	38,318	38,402	4,627	167,391	40
pct	2	4	7	9	15	15	23	234	3	100	NAp

NAp Not applicable.
[1]Excluding job title category of office workers.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–43.—Metal and nonmetal mining 1986 workforce estimates:[1] experience at company, by sex

Experience at present company, yr	Male		Female		Unspecified		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct
0< to ≤1	20,203	12	866	19	176	18	21,245	13
1< to ≤5	38,063	24	1,399	31	255	26	39,718	24
5< to ≤10	35,751	22	1,424	31	153	16	37,328	22
10< to ≤15	24,122	15	643	14	112	11	24,878	15
15< to ≤20	16,952	10	85	2	88	9	17,124	10
20< to ≤25	8,898	5	46	1	66	7	9,011	5
25< to ≤30	6,102	4	21	0	24	2	6,147	4
30<	8,056	5	8	0	0	0	8,064	5
Unspecified	3,735	2	30	1	110	11	3,876	2
Total	161,883	100	4,523	100	984	100	167,391	100
Median, yr	8	NAp	5	NAp	6	NAp	8	NAp

NAp Not applicable.
[1]Excluding job title category of office workers.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–44.—Metal and nonmetal mining 1986 workforce estimates:[1] experience at company, by race

Experience at present company, yr	White		Black		Hispanic		Other		Unspecified		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
0< to ≤1	17,327	13	1,313	11	1,788	13	420	16	398	23	21,245	13
1< to ≤5	32,889	24	2,261	18	3,472	25	688	26	408	24	39,718	24
5< to ≤10	30,172	22	2,709	22	3,584	26	556	21	307	18	37,328	22
10< to ≤15	20,043	15	2,547	21	1,692	12	454	17	143	8	24,878	15
15< to ≤20	13,962	10	1,433	12	1,425	10	212	8	91	5	17,124	10
20< to ≤25	7,560	6	785	6	490	4	119	5	57	3	9,011	5
25< to ≤30	5,380	4	391	3	256	2	66	2	55	3	6,147	4
30<	6,766	5	651	5	589	4	46	2	13	1	8,064	5
Unspecified	2,842	2	323	3	413	3	66	3	232	14	3,876	2
Total	136,940	100	12,413	100	13,708	100	2,626	100	1,703	100	167,391	100
Median, yr	8	NAp	10	NAp	7	NAp	7	NAp	5	NAp	8	NAp

NAp Not applicable.
[1]Excluding job title category of office workers.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–45.—Metal and nonmetal mining 1986 workforce estimates:[1] experience at company, by education

Experience at present company, yr	Some elementary		Some high school		High school diploma		Vocational diploma		Some college		College degree		Unspecified		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
0< to ≤1	1,281	10	3,475	12	10,117	13	1,835	15	2,074	14	886	11	1,577	12	21,245	13
1< to ≤5	2,311	18	6,408	23	19,079	25	3,191	26	3,682	24	2,138	26	2,909	22	39,718	24
5< to ≤10	2,342	18	5,592	20	17,165	22	3,063	25	4,094	27	2,507	31	2,566	20	37,328	22
10< to ≤15	1,905	15	3,899	14	11,672	15	1,936	15	2,458	16	1,194	15	1,814	14	24,878	15
15< to ≤20	1,678	13	3,285	12	8,072	10	1,260	10	1,178	8	492	6	1,159	9	17,124	10
20< to ≤25	836	6	1,651	6	4,472	6	411	3	681	4	257	3	703	5	9,011	5
25< to ≤30	971	7	1,405	5	2,418	3	273	2	366	2	209	3	506	4	6,147	4
30<	1,551	12	1,579	6	3,235	4	350	3	417	3	269	3	663	5	8,064	5
Unspecified	137	1	611	2	1,317	2	178	1	305	2	151	2	1,176	9	3,876	2
Total	13,012	100	27,904	100	77,548	100	12,498	100	15,254	100	8,103	100	13,072	100	167,391	100
Median, yr	12	NAp	9	NAp	8	NAp	7	NAp	8	NAp	7	NAp	8	NAp	8	NAp

NAp Not applicable.
[1]Excluding job title category of office workers.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–46.—Metal and nonmetal mining 1986 workforce estimates:[1] age, by education

Age, yr	Some elementary		Some high school		High school diploma		Vocational diploma		Some college		College degree		Unspecified		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
15–20	95	4	535	20	1,335	51	220	8	254	10	15	1	159	6	2,612	100
21–23	257	4	1,071	16	3,656	54	570	8	547	8	145	2	586	9	6,831	100
24–26	350	3	1,679	14	6,645	57	912	8	951	8	418	4	750	6	11,705	100
27–29	413	3	1,956	13	7,744	53	1,408	10	1,450	10	750	5	850	6	14,572	100
30–34	929	4	3,283	13	12,784	50	2,153	8	3,084	12	1,689	7	1,568	6	25,490	100
35–39	1,062	4	3,269	13	11,445	46	2,310	9	3,212	13	1,825	7	1,710	7	24,833	100
40–49	3,198	8	7,463	19	17,197	45	2,816	7	3,253	8	1,765	5	2,626	7	38,318	100
50 +	6,587	17	8,086	21	14,922	39	1,944	5	2,313	6	1,328	3	3,222	8	38,402	100
Unspecified	121	3	563	12	1,820	39	165	4	191	4	167	4	1,601	35	4,627	100
Total	13,012	8	27,904	17	77,548	46	12,498	7	15,254	9	8,103	5	13,072	8	167,391	100
Mean age .....yr....	48	NAp	42	NAp	38	NAp	38	NAp	38	NAp	39	NAp	41	NAp	40	NAp

NAp Not applicable.
[1]Excluding job title category of office workers.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–47.—Metal and nonmetal mining 1986 workforce estimates:[1] age, race, and education, by sex

	Male		Female		Unspecified		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct
Age, yr:								
15–20	2,515	2	91	2	6	1	2,612	2
21–23	6,505	4	203	4	123	12	6,831	4
24–26	11,195	7	450	10	60	6	11,705	7
27–29	13,859	9	613	14	100	10	14,572	9
30–34	24,693	15	721	16	76	8	25,490	15
35–39	23,948	15	765	17	121	12	24,833	15
40–49	37,124	23	1,005	22	189	19	38,318	23
50 +	37,623	23	616	14	163	17	38,402	23
Unspecified	4,421	3	59	1	146	15	4,627	3
Total	161,883	100	4,523	100	984	100	167,391	100
Mean age .....yr....	40	NAp	37	NAp	38	NAp	40	NAp
Race:								
White	132,846	82	3,753	83	341	35	136,940	82
Black	11,885	7	419	9	110	11	12,413	7
Hispanic	13,413	8	261	6	34	3	13,708	8
Other	2,520	2	76	2	30	3	2,626	2
Unspecified	1,219	1	15	0	470	48	1,703	1
Total	161,883	100	4,523	100	984	100	167,391	100
Education level:								
Some elementary	12,823	8	152	3	36	4	13,012	8
Some high school	27,264	17	520	11	120	12	27,904	17
High school diploma	74,997	46	2,197	49	354	36	77,548	46
Vocational diploma	12,031	7	338	7	129	13	12,498	7
Some college	14,513	9	696	15	45	5	15,254	9
College degree	7,657	5	387	9	60	6	8,103	5
Unspecified	12,598	8	234	5	240	24	13,072	8
Total	161,883	100	4,523	100	984	100	167,391	100

NAp Not applicable.
[1]Excluding job title category of office workers.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–48.—Metal and nonmetal mining 1986 workforce estimates:[1] age and education, by race

	White		Black		Hispanic		Other		Unspecified		Total	
	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct	Workers	pct
Age, yr:												
15–20	2,198	2	163	1	189	1	43	2	19	1	2,612	2
21–23	5,516	4	368	3	689	5	107	4	152	9	6,831	4
24–26	9,411	7	664	5	1,240	9	255	10	135	8	11,705	7
27–29	11,961	9	939	8	1,272	9	252	10	148	9	14,572	9
30–34	20,690	15	2,024	16	2,098	15	437	17	241	14	25,490	15
35–39	20,248	15	1,801	15	2,100	15	340	13	165	10	24,833	15
40–49	30,941	23	3,429	28	3,121	23	572	22	256	15	38,318	23
50+	32,264	24	2,946	24	2,444	18	539	21	208	12	38,402	23
Unspecified	3,531	3	81	1	556	4	80	3	379	22	4,627	3
Total	136,940	100	12,413	100	13,708	100	2,626	100	1,703	100	167,391	100
Mean age, yr	40	NAp	41	NAp	38	NAp	39	NAp	36	NAp	40	NAp
Education level:												
Some elementary	8,546	6	1,969	16	2,325	17	152	6	18	1	13,012	8
Some high school	21,100	15	3,354	27	2,748	20	499	19	204	12	27,904	17
High school diploma	66,214	48	4,614	37	5,122	37	1,174	45	424	25	77,548	46
Vocational diploma	10,746	8	613	5	722	5	257	10	160	9	12,498	7
Some college	13,240	10	520	4	1,119	8	297	11	79	5	15,254	9
College degree	7,534	6	120	1	191	1	112	4	146	9	8,103	5
Unspecified	9,560	7	1,223	10	1,481	11	135	5	673	39	13,072	8
Total	136,940	100	12,413	100	13,708	100	2,626	100	1,703	100	167,391	100

NAp Not applicable.
[1]Excluding job title category of office workers.

NOTE.—Owing to independent rounding, data may not add to totals shown.

TABLE E–49.—Metal and nonmetal mining 1986 workforce estimates: number of workers and coefficient of variation—employment size class, by type of ore mined

Employment size class[1]	Metal		Stone		Sand and gravel		Nonmetal		All	
	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct
1–19	1,771	16.0	18,511	4.4	25,200	3.3	3,825	5.4	49,307	2.4
20–49	1,695	27.3	17,215	7.8	9,117	14.1	4,062	8.9	32,088	3.9
50–99	2,101	15.5	10,145	6.0	2,444	9.7	4,360	7.4	19,050	5.4
100–249	7,715	6.6	23,219	3.4	339	5.7	9,049	7.3	40,322	4.0
250–499	5,590	1.0	3,726	.8	0	.0	5,514	6.3	14,829	2.3
500+	17,068	.5	540	5.4	0	.0	6,625	1.8	24,233	.7
All groupings	35,940	1.4	73,357	1.1	37,100	3.0	33,434	2.9	179,831	.8

[1]MSHA size groups are based on the annual average employment of the primary subunit and not on the total employment; hence, MSHA published injury statistics by size groups should not be analyzed against these data.

NOTE.—Owing to independent rounding, the data for individual entries on number of workers may not equal total shown.

TABLE E–50.—Metal and nonmetal mining 1986 workforce estimates: number of workers and coefficient of variation—job title, by type of ore mined

Job title grouping[1]	Metal		Stone		Sand and gravel		Nonmetal		All	
	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct
Backhoe-crane-dragline-shovel operator	557	28.6	2,118	7.4	1,279	13.1	983	11.4	4,937	6.8
Beltman-belt repairman	127	69.1	319	11.0	208	20.8	146	52.0	800	13.8
Blaster	189	26.2	336	11.7	3	100.0	77	50.4	605	12.9
Deckhand-barge and dredge operator	12	65.8	171	37.3	853	7.5	68	13.1	1,103	10.9
Dozer-heavy and mobile equipment operator	1,040	10.2	1,775	7.2	1,381	13.4	1,092	8.6	5,288	4.1
Driller-rock bolter	1,029	12.2	2,058	2.8	56	33.2	558	17.7	3,700	4.7
Electrician-lampman	1,663	7.8	1,433	4.3	75	21.0	608	13.3	3,780	4.9
Front-end loader-forklift operator	629	13.2	6,095	4.2	5,933	4.7	1,286	10.5	13,942	3.8
Grader-scraper operator	195	28.9	415	20.4	352	30.5	361	27.8	1,323	11.8
Laborer-miner-utility man	4,284	7.0	8,771	3.9	2,918	5.7	4,046	8.5	20,109	4.3
Manager-foreman-supervisor:										
General	1,558	6.8	4,543	3.2	3,466	2.6	2,152	5.0	11,719	2.2
Maintenance	537	19.1	708	8.1	40	17.3	537	12.1	1,821	4.9
Working	1,874	9.9	2,362	5.8	387	15.7	1,519	13.4	6,143	5.0
Mechanic-welder-oiler-machinist	7,857	3.6	11,458	2.8	3,299	4.4	5,929	5.5	28,543	2.3
Mine technical support	4,076	7.3	4,524	3.9	1,439	13.4	3,000	11.2	13,038	3.6
Office worker	1,886	9.7	5,010	5.6	3,188	8.9	2,356	4.1	12,440	3.4
Plant operator-warehouseman	5,275	2.4	11,377	1.9	3,918	2.5	6,742	4.0	27,312	1.5
Shuttle car-tram operator	968	14.5	213	26.5	32	42.7	394	22.7	1,607	9.8
Stone cutter-finisher	0	.0	864	21.2	0	.0	15	100.0	879	20.5
Truck driver	2,184	8.4	8,808	3.6	8,274	9.5	1,565	12.0	20,830	3.5
All groupings	35,940	1.4	73,357	1.1	37,100	3.0	33,434	2.9	179,831	.8

[1]As defined by MSHA; see appendix A for detailed explanation of job title groupings.

NOTE.—Owing to independent rounding, the data for individual entries on number of workers may not equal total shown.

TABLE E–51.—Metal and nonmetal mining 1986 workforce estimates:[1] number of workers and coefficient of variation—principal equipment operated, by type of ore mined

Equipment operated grouping[2]	Metal		Stone		Sand and gravel		Nonmetal		All	
	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct
Backhoe-crane-dragline-shovel	650	22.9	2,228	6.6	1,323	10.8	887	9.7	5,088	5.9
Belt	127	69.1	404	9.8	247	24.9	157	47.0	936	13.3
Dozer-heavy and mobile equipment	961	11.0	1,616	9.7	1,164	8.1	1,102	14.1	4,843	4.8
Drill (underground)-rock bolter	823	19.0	485	25.8	3	100.0	275	30.7	1,586	16.2
Drill (surface)	328	16.1	1,898	4.3	52	37.4	313	25.3	2,591	6.2
Explosives	175	29.3	332	11.4	3	100.0	77	50.4	588	13.3
Front-end loader-forklift	1,003	8.7	7,538	4.0	6,640	4.9	1,915	6.1	17,096	3.2
Grader-scraper	195	28.9	427	19.8	400	25.7	506	17.9	1,529	8.7
Handtools (powered and nonpowered)	7,888	2.3	10,370	3.8	2,787	4.9	6,564	7.3	27,609	1.7
Hoist-elevator	221	16.2	36	62.1	0	.0	203	43.6	460	23.3
Many equipment	567	33.5	684	14.5	326	20.9	840	9.4	2,417	4.3
Miscellaneous utility equipment	2,371	11.0	5,423	6.5	1,733	9.6	1,915	10.8	11,442	6.2
Plant equipment	4,036	5.9	9,105	1.8	5,045	3.7	5,304	4.0	23,489	1.6
Pump	195	38.4	168	23.9	216	18.0	179	37.4	758	9.0
Scale-lab equipment-controls	1,772	13.1	3,316	4.9	985	18.0	1,506	7.0	7,579	4.8
Shuttle car-locomotive	1,050	9.8	312	18.9	21	48.8	389	13.6	1,772	4.9
Stone cutting-finishing machine	0	.0	868	20.7	0	.0	15	106.9	883	19.9
Truck (haulage)	2,299	7.5	9,119	3.6	8,501	9.0	1,570	12.1	21,488	3.5
Truck (utility)-personnel carrier	1,080	12.6	989	7.4	211	13.5	604	18.3	2,885	5.3
Welding machine-lathe	1,632	10.3	2,904	5.9	808	11.3	443	21.0	5,787	4.3
None	6,212	4.9	9,235	3.1	3,300	3.7	5,837	5.3	24,584	2.6
Not elsewhere classified	294	34.0	193	33.5	57	58.1	145	28.9	689	21.9
Unspecified	174	36.8	695	14.0	90	27.1	333	28.4	1,292	10.3
All groupings	34,054	1.6	68,347	1.3	33,912	2.6	31,078	2.9	167,391	.9

[1]Excluding job title category of office workers.
[2]See appendix B for detailed explanation of equipment operated grouping.

NOTE.—Owing to independent rounding, the data for individual entries on number of workers may not equal total shown.

TABLE E–52.—Metal and nonmetal mining 1986 workforce estimates: number of workers and coefficient of variation—work location at mine, by type of ore mined

Work location	Metal		Stone		Sand and gravel		Nonmetal		All	
	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct
Underground mine	4,980	8.9	1,094	11.7	0	.0	3,643	5.5	9,717	3.4
Surface at underground mine	1,756	6.5	658	16.0	0	.0	1,783	6.3	4,197	4.0
Surface mine	10,992	2.8	35,742	1.7	26,631	2.7	11,208	3.1	84,572	.9
Plant or mill	15,126	3.8	28,546	3.1	6,026	8.3	13,634	5.6	63,332	2.4
Office	3,087	6.3	7,316	4.0	4,443	8.5	3,167	6.5	18,012	3.0
All groupings	35,940	1.4	73,357	1.1	37,100	3.0	33,434	2.9	179,831	.8

NOTE.—Owing to independent rounding, the data for individual entries on number of workers may not equal total shown.

TABLE E–53.—Metal and nonmetal mining 1986 workforce estimates:[1] number of workers and coefficient of variation—experience at job, company, and mining, by type of ore mined

Experience, yr	Metal		Stone		Sand and gravel		Nonmetal		All	
	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct
At present job:										
0< to ≤1	6,616	7.2	13,067	4.7	6,625	5.9	4,900	9.0	31,206	2.5
1< to ≤2	3,665	7.2	8,365	3.7	3,812	5.1	3,681	8.8	19,523	3.4
2< to ≤3	2,764	3.4	6,185	4.9	3,214	4.3	2,142	11.2	14,305	2.6
3< to ≤5	3,349	4.9	8,392	5.9	3,932	2.4	3,711	5.4	19,383	2.9
5< to ≤10	8,223	5.2	14,212	3.8	5,856	7.0	8,197	5.8	36,488	2.2
10< to ≤20	6,492	3.2	9,702	6.0	4,884	4.8	5,253	7.8	26,332	3.3
20<	2,117	10.0	3,814	8.9	2,172	5.3	841	12.8	8,943	3.7
Unspecified	828	15.7	4,611	15.2	3,417	15.8	2,353	17.1	11,210	6.5
All groupings	34,054	1.6	68,347	1.3	33,912	2.6	31,078	2.9	167,391	.9
At present company:										
0< to ≤1	4,312	7.4	8,741	4.1	5,818	5.1	2,375	10.0	21,245	3.0
1< to ≤5	5,915	5.7	16,500	3.5	10,698	4.9	6,604	5.5	39,718	1.8
5< to ≤10	7,713	4.2	14,282	2.6	6,642	5.4	8,691	7.2	37,328	1.4
10< to ≤15	5,568	4.1	9,269	3.8	3,934	4.0	6,108	4.5	24,878	1.7
15< to ≤20	5,064	7.3	6,670	5.4	2,418	8.8	2,972	7.4	17,124	3.4
20< to ≤25	2,188	5.7	3,550	4.8	1,281	10.6	1,992	9.3	9,011	3.1
25< to ≤30	1,482	6.8	2,867	9.0	883	11.1	914	7.4	6,147	6.2
30<	1,552	6.0	4,126	9.3	999	17.0	1,387	9.2	8,064	7.8
Unspecified	260	40.5	2,343	19.2	1,238	20.9	35	54.3	3,876	13.7
All groupings	34,054	1.6	68,347	1.3	33,912	2.6	31,078	2.9	167,391	.9
Total mining:										
0< to ≤1	1,524	11.3	6,577	4.3	3,439	6.6	1,426	11.7	12,966	2.4
1< to ≤5	3,830	5.0	12,337	3.2	7,375	3.6	4,684	7.3	28,226	2.2
5< to ≤10	7,141	3.3	13,951	3.6	5,852	6.4	7,505	9.1	34,448	1.8
10< to ≤15	6,413	3.4	9,500	3.6	3,835	4.0	5,713	6.4	25,461	2.4
15< to ≤20	5,751	6.0	6,994	3.7	2,466	8.3	2,945	7.3	18,156	2.8
20< to ≤25	2,740	7.4	3,955	4.0	1,361	11.5	1,723	10.1	9,779	5.4
25< to ≤30	1,740	9.7	3,037	7.5	912	6.3	884	11.8	6,573	5.0
30<	1,883	6.7	4,269	6.6	1,114	13.8	1,424	10.3	8,691	6.6
Unspecified	3,032	4.6	7,727	8.0	7,558	11.8	4,774	9.5	23,091	4.8
All groupings	34,054	1.6	68,347	1.3	33,912	2.6	31,078	2.9	167,391	.9

[1]Excluding job title category of office workers.

NOTE.—Owing to independent rounding, the data for individual entries on number of workers may not equal total shown.

TABLE E-54.—Metal and nonmetal mining 1986 workforce estimates:[1] number of workers and coefficient of variation—training received, by type of ore mined

Job training for last 2 yr, h	Metal		Stone		Sand and gravel		Nonmetal		All	
	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct
0	1,667	7.9	5,175	15.3	6,132	9.0	2,178	25.5	15,152	6.3
1–8	1,227	16.3	5,879	12.2	2,509	11.7	1,363	20.1	10,979	6.9
9–15	1,132	7.1	3,230	9.0	902	13.0	381	21.6	5,644	6.9
16	5,046	6.3	11,632	6.3	4,238	8.9	7,132	5.3	28,048	3.6
17–40	11,535	4.2	9,985	7.1	3,759	13.5	5,685	9.8	30,965	2.9
41–80	2,691	9.9	5,554	6.5	2,786	8.1	3,609	7.7	14,639	3.6
81–160	924	12.4	3,522	6.6	947	9.6	1,265	13.0	6,658	4.5
161+	2,035	5.8	2,488	14.2	733	5.8	931	20.1	6,188	6.0
Unspecified	7,798	3.0	20,883	7.3	11,905	7.8	8,532	7.2	49,118	3.9
All groupings	34,054	1.6	68,347	1.3	33,912	2.6	31,078	2.9	167,391	.9

[1]Excluding job title category of office workers.

NOTE.—Owing to independent rounding, the data for individual entries on number of workers may not equal total shown.

TABLE E-55.—Metal and nonmetal mining 1986 workforce estimates:[1] number of workers and coefficient of variation—age, by type of ore mined

Age, yr	Metal		Stone		Sand and gravel		Nonmetal		All	
	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct
15–20	317	15.1	1,220	7.0	722	12.3	353	28.2	2,612	6.2
21–23	711	10.3	3,214	3.1	1,745	10.9	1,162	13.0	6,831	4.2
24–26	1,433	6.8	4,992	4.0	2,881	7.0	2,400	6.7	11,705	2.7
27–29	2,511	7.5	6,005	4.7	2,920	7.2	3,137	12.7	14,572	3.3
30–34	5,564	4.9	9,988	2.7	4,514	4.4	5,424	5.5	25,490	1.5
35–39	6,171	2.9	9,458	3.6	4,323	2.4	4,881	7.0	24,833	1.3
40–49	9,559	2.1	15,250	2.6	6,583	4.8	6,926	5.3	38,318	1.5
50+	7,482	3.4	16,466	4.0	7,821	4.7	6,632	2.2	38,402	2.2
Unspecified	308	7.6	1,754	19.0	2,404	16.2	162	40.5	4,627	8.8
All groupings	34,054	1.6	68,347	1.3	33,912	2.6	31,078	2.9	167,391	.9

[1]Excluding job title category of office workers.

NOTE.—Owing to independent rounding, the data for individual entries on number of workers may not equal total shown.

TABLE E-56.—Metal and nonmetal mining 1986 workforce estimates:[1] number of workers and coefficient of variation—sex, race, and education, by type of ore mined

	Metal		Stone		Sand and gravel		Nonmetal		All	
	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct	Workers	CV, pct
Sex:										
Male	32,735	1.7	66,326	1.4	32,949	2.6	29,873	2.7	161,883	.9
Female	1,182	10.6	1,490	6.9	790	13.2	1,061	18.9	4,523	3.4
Unspecified	136	51.9	531	25.3	174	32.2	143	48.3	984	19.6
All groupings	34,054	1.6	68,347	1.3	33,912	2.6	31,078	2.9	167,391	.9
Race:										
White	28,798	2.3	56,171	1.4	28,644	2.8	23,327	3.7	136,940	.9
Black	793	20.3	5,119	14.1	1,742	9.0	4,758	6.8	12,413	7.2
Hispanic	3,469	7.1	5,353	7.1	2,448	8.7	2,439	7.6	13,708	2.2
Other	671	8.6	1,101	15.5	456	12.4	399	11.8	2,626	8.2
Unspecified	324	31.8	603	31.3	622	33.2	154	38.1	1,703	15.3
All groupings	34,054	1.6	68,347	1.3	33,912	2.6	31,078	2.9	167,391	.9
Education level:										
Some elementary	1,682	14.8	6,349	8.5	2,812	11.1	2,168	9.4	13,012	4.1
Some high school	3,650	7.2	13,068	4.0	6,030	6.9	5,155	8.0	27,904	2.5
High school diploma	15,733	1.7	31,371	4.1	15,792	4.4	14,652	3.8	77,548	1.7
Vocational diploma	3,243	7.3	4,520	9.7	2,171	12.8	2,563	14.2	12,498	5.5
Some college	5,425	1.6	5,120	7.7	2,212	6.1	2,497	12.9	15,254	2.2
College degree	3,079	8.1	2,549	3.9	879	11.2	1,596	11.3	8,103	3.9
Unspecified	1,242	12.8	5,370	15.1	4,015	10.8	2,445	15.7	13,072	6.7
All groupings	34,054	1.6	68,347	1.3	33,912	2.6	31,078	2.9	167,391	.9

[1]Excluding job title category of office workers.

NOTE.—Owing to independent rounding, the data for individual entries on number of workers may not equal total shown.

APPENDIX F.—MINING INDUSTRY POPULATION SURVEY LETTERS AND QUESTIONNAIRE

United States Department of the Interior

BUREAU OF MINES
2401 E STREET, NW.
WASHINGTON, D.C. 20241

Dear Mine Manager:

The Bureau of Mines, U.S. Department of the Interior, is requesting your help in conducting a survey of the mining industry. The survey is designed to characterize the nation's mine-worker population by occupation, job experience, training, age, and other factors. These data are necessary to accurately analyze the nation's mine accidents. At this time, the information sought by this survey cannot be obtained from any other source.

Your firm was randomly selected to represent firms of a similar size in your industry. Although your response to this survey is voluntary, the validity of the results depends upon a very high response rate. We urge you, therefore, to respond as completely and accurately as possible based upon information from your personnel files, management records, or direct response from individual workers at your mine.

Under no circumstances will the information you provide be identified by individual mine, company, or worker. The data will be used for statistical purposes only and the results of the survey when analyzed with accident statistics will be made available to the public in the form of official publications.

Instructions for completing the survey questionnaire are on the enclosed survey form. Questions regarding the survey should be directed to:

Ms. Shail Butani
Bureau of Mines
5629 Minnehaha Avenue South
Minneapolis, MN 55417
Telephone: (612) 725-4500

(Note: Collect calls regarding this survey will be accepted during regular business hours, 8:00 a.m. to 4:00 p.m., Central Time.)

Thank you for your time and effort.

Sincerely,

Robert C. Horton

Director

Enclosure

United States Department of the Interior

BUREAU OF MINES
2401 E STREET, NW.
WASHINGTON, D.C. 20241

Dear Employer:

Recently, we wrote to you requesting your help in obtaining data for a survey for the mining industry. This information will be used to produce the characteristics of the nation's mine-worker population in order to analyze the nation's mine accident data more accurately. We have not yet received your response and have enclosed an additional survey questionnaire in case the original was misplaced or did not reach you.

Because your firm was randomly selected to represent firms of a similar size in your industry, we are making every effort to obtain your response to ensure a true representation of those firms. Your response is strictly confidential and will be used for statistical purposes only.

If you have any questions, please refer to the instructions on the first page of the questionnaire or call collect, Ms. Shail Butani at 612-725-4500. If you prefer, you may report your information directly by telephone. A response during the next 2 weeks would be great assistance to the survey.

Thank you for your help and support in the Bureau's effort to characterize the mine-worker population.

Sincerely,

Robert C. Horton
Director

Enclosure

U.S. BUREAU OF MINES
Twin Cities Research Center
5629 Minnehaha Avenue South
Minneapolis, MN 55417
(612) 725-4500

MINING INDUSTRY

POPULATION SURVEY

INSTRUCTIONS:

1. Fill out this form as completely as possible and return it in the enclosed stamped envelope within three weeks.
2. This form is only for the operation with mine I.D. number as shown on the address label. Do not use for any other operation.
3. As an alternative to completing the forms, you are welcome to send copies of any administrative records, containing the requested information on *all* employees. However, it is very important that all the information requested on the forms be contained in the records.
4. (a) Obtain a list or lists of *all* the employees (hourly, salaried, managerial, and office workers, etc.) working in the operation with mine I.D. number shown on the label. It is important that each employee appear on one and only one list.
   (b) Sequentially number the employees starting with one list continuing until all the lists are exhausted.
   (c) Determine the total number of employees at this mine I.D. operation. Note: This number should be the same as the last number on the employees list.
   (d) Based on the total number of employees, mark the appropriate employment size box below.

Total No. of Employees		Selection Numbers
1 — 49	☐	All employees (1, 2, 3, 4, 5 . . .)
50 — 99	☐	Every other employee starting with employee No. 1 (1, 3, 5, 7, 9 . . .)
100 — 249	☐	Every 5th employee starting with employee No. 4 (4, 9, 14, 19, 24 . . .)
250 — 499	☐	Every 10th employee starting with employee No. 7 (7, 17, 27, 37, 47 . . .)
500 — 999	☐	Every 20th employee starting with employee No. 12 (12, 32, 52, 72, 92 . . .)
1,000 +	☐	Every 30th employee starting with employee No. 15 (15, 45, 75, 105, 135 . . .)

   (e) Record the information on the attached questionnaire for each worker whose number on the employee list corresponds to the selection numbers that fall in the above marked employment size category. Note: Depending on the total number of employees at this mine, it may not be necessary to complete all lines on the questionnaire.
   (f) See Example below.
5. If you should have any questions or need assistance in completing the form please contact →
6. Company representative to be contacted regarding this report:

MS. SHAIL BUTANI
U.S. Bureau of Mines
Twin Cities Research Center
5629 Minnehaha Avenue South
Minneapolis, MN 55417
CALL COLLECT (612) 725-4500

Name _____ Title _____ Phone ( ) _____

EXAMPLE:

Suppose there are 153 hourly employees, 31 salaried employees, and 9 office employees at Mine Operation XYZ.

Procedure:
1. Number the workers on one list first, say office (1-9).
2. Continuously number the workers on the 2nd list, say salaried (10-40).
3. Continuously number the workers on the next list, hourly (41-193).
4. Total number of employees at Mine ID XYZ is 193. Hence, check the box inside 100-249 employees.
5. Record information for employees whose numbers are 4, 9, 14, 19, 24, 29, 34 . . . 179, 184, 189.
   Note: In this case, a total of 38 employees are in the sample.

O.M.B. No. 1219-0098
Approval Exp. 9/30/1986

U.S. BUREAU OF MINES
Twin Cities Research Center
5629 Minnehaha Avenue South
Minneapolis, MN 55417
(612) 725-4500

MINING INDUSTRY
POPULATION SURVEY

EMPLOYEE DATA:

Sample No.	Job title or occupation	Principal equipment operated (if any)	Principal operation subunit code[1]	Experience: This job	Experience: This co.	Experience: Total mine	Job-related training during last 2 years	Age	Sex	Race[2]	Education[3]
			U SU S P O	yrs/mo	yrs/mos	yrs/mos	wks/hrs	yrs.	M F	W B H O U	E SH HD V SC CD
EXAMPLE	truck driver	truck	☐☐☒☐☐	5/3	7/0	8/6	4/10	29	☒☐	☐☐☐☒☐	☐☒☐☐☐☐
1.			☐☐☐☐☐						☐☐	☐☐☐☐☐	☐☐☐☐☐☐
2.			☐☐☐☐☐						☐☐	☐☐☐☐☐	☐☐☐☐☐☐
3.			☐☐☐☐☐						☐☐	☐☐☐☐☐	☐☐☐☐☐☐
4.			☐☐☐☐☐						☐☐	☐☐☐☐☐	☐☐☐☐☐☐
5.			☐☐☐☐☐						☐☐	☐☐☐☐☐	☐☐☐☐☐☐
6.			☐☐☐☐☐						☐☐	☐☐☐☐☐	☐☐☐☐☐☐
7.			☐☐☐☐☐						☐☐	☐☐☐☐☐	☐☐☐☐☐☐
8.			☐☐☐☐☐						☐☐	☐☐☐☐☐	☐☐☐☐☐☐
9.			☐☐☐☐☐						☐☐	☐☐☐☐☐	☐☐☐☐☐☐
10.			☐☐☐☐☐						☐☐	☐☐☐☐☐	☐☐☐☐☐☐
11.			☐☐☐☐☐						☐☐	☐☐☐☐☐	☐☐☐☐☐☐
12.			☐☐☐☐☐						☐☐	☐☐☐☐☐	☐☐☐☐☐☐
13.			☐☐☐☐☐						☐☐	☐☐☐☐☐	☐☐☐☐☐☐
14.			☐☐☐☐☐						☐☐	☐☐☐☐☐	☐☐☐☐☐☐
15.			☐☐☐☐☐						☐☐	☐☐☐☐☐	☐☐☐☐☐☐
16.			☐☐☐☐☐						☐☐	☐☐☐☐☐	☐☐☐☐☐☐
17.			☐☐☐☐☐						☐☐	☐☐☐☐☐	☐☐☐☐☐☐
18.			☐☐☐☐☐						☐☐	☐☐☐☐☐	☐☐☐☐☐☐
19.			☐☐☐☐☐						☐☐	☐☐☐☐☐	☐☐☐☐☐☐
20.			☐☐☐☐☐						☐☐	☐☐☐☐☐	☐☐☐☐☐☐

[1] U — underground; SU - surface operations at underground mines; S - surface; P - preparation plant or mill; O - office worker
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[3] E — 1 through 8th grade; SH — some high school; HD — high school diploma; V — vocational; SC — some college; CD — college degree

U.S. BUREAU OF MINES
Twin Cities Research Center
5629 Minnehaha Avenue South
Minneapolis, MN 55417
(612) 725-4500

MINING INDUSTRY
POPULATION SURVEY

EMPLOYEE DATA:

Sample No.	Job title or occupation	Principal equipment operated (if any)	Principal operation subunit code[1]	Experience: This job	Experience: This co.	Experience: Total mine	Job-related training during last 2 years	Age	Sex	Race[2]	Education[3]
			U SU S P O	yrs/mo	yrs/mos	yrs/mos	wks/hrs	yrs.	M F	W B H O U	E SH HD V SC CD
EXAMPLE	truck driver	truck	☐☐☒☐☐	5/3	7/0	8/6	4/10	29	☒ ☐	☐ ☐ ☐ ☒ ☐	☐ ☒ ☐ ☐ ☐ ☐
21.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
22.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
23.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
24.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
25.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
26.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
27.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
28.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
29.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
30.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
31.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
32.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
33.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
34.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
35.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
36.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
37.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
38.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
39.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
40.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐

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			U SU S P O	yrs/mo	yrs/mos	yrs/mos	wks/hrs	yrs.	M F	W B H O U	E SH HD V SC CD
EXAMPLE	truck driver	truck	☐☐☒☐☐	5/3	7/0	8/6	4/10	29	☒ ☐	☐ ☐ ☐ ☒ ☐	☐ ☒ ☐ ☐ ☐ ☐
41.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
42.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
43.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
44.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
45.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
46.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
47.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
48.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
49.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
50.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
51.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
52.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
53.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
54.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
55.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
56.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
57.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
58.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
59.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐
60.			☐☐☐☐☐						☐ ☐	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐

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